Installation and Operation Manual
X-VA-MT3809G-MT3810G-eng
Part Number: 541B182AAG
July, 2015

Brooks® Models MT3809G and MT3810G
Metal Tube Variable Area Flowmeters

Model MT3809G
General Purpose Housing

Model MT3809G
Explosion Proof Housing

Model MT3809G
Intrinsically Safe Housing

BROOKS® INSTRUMENT

Models MT3809G & MT3810G

Essential Instructions
Read before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. These products must be properly installed, operated and maintained to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, operating and maintaining Brooks Instrument products.

- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- Read all instructions prior to installing, operating and servicing the product. If this instruction manual is not the correct manual, please see back cover for local sales office contact information. Save this instruction manual for future reference.

⚠ **WARNING: Do not operate this instrument in excess of the specifications listed in the Instruction and Operation Manual. Failure to heed this warning can result in serious personal injury and / or damage to the equipment.**

- If you do not understand any of the instructions, contact your Brooks Instrument representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.
- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- Operation: (1) Slowly initiate flow into the system. Open process valves slowly to avoid flow surges. (2) Check for leaks around the flow meter inlet and outlet connections. If no leaks are present, bring the system up to the operating pressure.
- Please make sure that the process line pressure is removed prior to service. When replacement parts are required, ensure that qualified people use replacement parts specified by Brooks Instrument. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place to prevent electrical shock and personal injury, except when maintenance is being performed by qualified persons.

⚠ **WARNING: For liquid flow devices, if the inlet and outlet valves adjacent to the devices are to be closed for any reason, the devices must be completely drained. Failure to do so may result in thermal expansion of the liquid that can rupture the device and may cause personal injury.**

European Pressure Equipment Directive (PED)

All pressure equipment with an internal pressure greater than 0.5 bar (g) and a size larger than 25mm or 1" (inch) falls under the Pressure Equipment Directive (PED).

- The Specifications Section of this manual contains instructions related to the PED directive.
- Meters described in this manual are in compliance with EN directive 97/23/EC.
- All Brooks Instrument Flowmeters fall under fluid group 1.
- Meters larger than 25mm or 1" (inch) are in compliance with PED category I, II or III.
- Meters of 25mm or 1" (inch) or smaller are Sound Engineering Practice (SEP).

European Electromagnetic Compatibility (EMC)

The Brooks Instrument (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 2004/108/EC).
Special attention however is required when selecting the signal cable to be used with CE marked equipment.

Quality of the signal cable, cable glands and connectors:

Brooks Instrument supplies high quality cable(s) which meets the specifications for CE certification.
If you provide your own signal cable you should use a cable which is overall completely screened with a 100% shield.
“D” or “Circular” type connectors used should be shielded with a metal shield. If applicable, metal cable glands must be used providing cable screen clamping.
The cable screen should be connected to the metal shell or gland and shielded at both ends over 360 Degrees.
The shield should be terminated to an earth ground.
Card Edge Connectors are standard non-metallic. The cables used must be screened with 100% shield to comply with CE certification.
The shield should be terminated to an earth ground.
For pin configuration : Please refer to the enclosed Instruction Manual.

ESD (Electrostatic Discharge)

⚠ **CAUTION: This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.**

Handling Procedure:

1. Power to unit must be removed.
2. Personnel must be grounded, via a wrist strap or other safe, suitable means before any printed circuit card or other internal device is installed, removed or adjusted.
3. Printed circuit cards must be transported in a conductive container. Boards must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in protective container for transport, storage or return to factory.

Comments

This instrument is not unique in its content of ESD (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, SMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

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Dear Customer,

We appreciate this opportunity to service your flow measurement and control requirements with a Brooks Instrument device. Every day, flow customers all over the world turn to Brooks Instrument for solutions to their gas and liquid low-flow applications. Brooks provides an array of flow measurement and control products for various industries from biopharmaceuticals, oil and gas, fuel cell research and chemicals, to medical devices, analytical instrumentation, semiconductor manufacturing, and more.

The Brooks product you have just received is of the highest quality available, offering superior performance, reliability and value to the user. It is designed with the ever changing process conditions, accuracy requirements and hostile process environments in mind to provide you with a lifetime of dependable service.

We recommend that you read this manual in its entirety. Should you require any additional information concerning Brooks products and services, please contact your local Brooks Sales and Service Office listed on the back cover of this manual or visit www.BrooksInstrument.com

Yours sincerely,
Brooks Instrument

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1-1 Descripton

The Brooks® Models MT3809 and MT3810 are rugged, all metal flowmeters offering reliable operation based on the variable area principle. The Model MT3809 is constructed with stainless steel components for measuring a variety of liquid and gas applications while the Model MT3809 ETFE utilizes an E/TFE lining for aggressive liquid and gas applications.

Flow rate indication is provided by means of magnetic coupling where a magnet, encapsulated in the float, is coupled to a rotatable magnet located in the rear of the indicator, thus turning the dial indicator mounted on the meter.

Optional accessories available include 4-20 mA analog output with HART® microprocessor transmitter with or without configurable alarms and pulse output for totalization. Also available are front adjustable inductive alarms, high temperature or stainless steel indicator housings, valves, flow controllers and certifications.

1-2 Design Features

The Brooks Model MT3809 has been the “go to” meter for several years and the choice of Engineering Contractor customers (EPC). Brooks is proud to raise the performance of the standard meter by adding these new features and options:

- New transmitter and alarm that meets SIL 2 requirements, the perfect product for safety applications
- LCD display with local operator interface without removing the cover which means changes can be made even in hazardous areas
- 316SS flameproof housing that meets IIC/Class 1 Div 1 now even more hazardous applicaton can be served by one meter
- The broadest range of operating temperatures in the industry, the perfect meter for even more applications
- Even lower flow rates with the current lay lengths which means one meter style can be used for very low to high flow rates
- The new meter is designed to ASME B31.3 and gasket sealing surface is per ASME a rugged design that does not require special gaskets at installation
- Weldneck flanges are standard which means full penetration welds that can easily be tested for integrity

1-3 Meter Specifications

Capacities, pressure drop and viscosity immunity ceilings:
Refer to Table 1-1.

⚠WARNING

Do not operate this instrument in excess of the specifications listed in Table 1-1. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

Table 1-1 Specifications Meter

Specifications	MT3809	MT3809 ELF	TFE Lined	MT3810
Measuring Range	See Capacity Tables 1-2A and 1-2B			
Rangeability	10:1 (most sizes)			
Metering Tube	316/316L (dual certified stainless steel)		316/316L (dual certified stainless steel) w/Tefzel Lining	316/316L (dual certified stainless steel)
	Alloy 625, Hastelloy C, Titanium Gr. II	Monel K-500, Hastelloy C		
Flanges and End Fittings	316/316L (dual certified stainless steel)		316/316L (dual certified stainless steel) w/Tefzel Lining	316/316L (dual certified stainless steel)
	Alloy 625, Hastelloy C, Titanium Gr. II			
Accuracy	2%, 1%, VDI/VDE class 1.6	5%, 3%, VDI/VDE class 4, 2.5	2%, VDI/VDE class 1.6	5%, VDI/VDE class 6
Repeatability	0.25% Full Scale	1% Full Scale	0.25% Full Scale	0.25% Full Scale
Scale	Black increments with white background - Plastic Material Silver increments with black background - Aluminum Material			
Connections	Weldneck flanges to ANSI B16.5, DIN 2527/2635		Flanges to ANSI B16.5, DIN 2527/2635	Weldneck flanges to ANSI B16.5, DIN 2527/2635
	1/2" to 2"NPT/Rc-Female	1/2" NPT/Rc-Female		1/2" to 2" NPT-Female
	1" to 2-1/2" NPT-Male	1" NPT-Male		
Flange Rating	ANSI 1/2" to 4" 150# RF to 600# RF	ANSI 1/2" to 1" 150# RF to 600# RF	ANSI 1/2" to 2" 150# RF to 300# RF	ANSI 1/2" to 2" 150# RF to 300# RF
	DIN PN 40		DIN PN40	
Standard Flange Finish	3.2 - 6.3 Ra			
Floats	316L stainless steel	316L stainless steel/Titanium	Hastelloy C-276 (sizes 7,8)	316L stainless steel
	Alloy 625, Hastelloy C Titanium Gr. II	Monel K-500, Hastelloy C	PVDF (sizes 10-13)	
O-rings	Viton	Kalrez 4079	None	Viton
	Teflon	Kalrez 3018	None	Teflon
Protection Category	IP67 / NEMA 4X			
Indicator Housing & Cover	Die cast Aluminum (Alloy 380), epoxy paint, glass window (general purpose)			
	*Die cast Aluminum (Alloy 380), epoxy paint, glass window (Intrinsic Safe)			
	Cast 316 stainless steel, glass window (general purpose)			
	Cast 316 stainless steel, 316 stainless steel hardware, glass window (flameproof)			
Pressure/Temperature	See Pressure/Temperature Tables 1-3A, 1-3B, 1-3C and 1-4			
Maximum Fluid Temperature	420°C/788°F (Refer to Table 1-4)		150°C/270°F	300°C/570°F
Meter Dimensions	Refer to Product Dimensions Figures 1-1, 1-2 and 1-3			
Pressure Equipment Directive (PED) 97/23/EC	Flowmeter complies under Sound Engineering Practices (SEP) or categories I, II, III			
Needle Control Valves	Sizes 7-12	Sizes 0-5	None	Sizes 7-12
Flow Controllers	Sizes 7-8	Sizes 0-5	None	Sizes 7 & 8
Inductive Alarm Switches *	1 or 2 inductive switches (Relay power supply recommended)			
Transmitter	4-20 mA output with HART Rev. 7 communications			
Transmitter and Inductive Alarm Switches*	4-20 mA output with HART Rev. 7 communications and 1 or 2 inductive switches (Relay power supply recommended)			
Transmitter, LCD Display and Inductive Switches*	4-20 mA output with HART Rev. 7 communications with digital display plus 1 or 2 inductive switches (Relay power supply recommended)			
Transmitter LCD Display Pulse Output	4-20 mA output with HART Rev. 7 communications and pulse output plus digital display			
General Purpose & Intrinsically Safe Power Supplies for Transmitter	24 Vdc, 110 Vac, 220 Vac			
Intrinsically Safe Power Supply/Relay for Alarms - Recommended*	24 Vdc, 110 Vac, 220 Vac			
Agency Approvals	Refer to Pages 1-10 to 1-13			
Other Approvals*	SIL 2 Alarms			
EMC Protection	The device complies with EU Directive 2004/108/EC, FCC Part 15, subpart B, Industry Canada, 1 CES-003 Recommendations NE21/NE43			

* Inductive Alarm or IS Housing does not apply to MT3809 ELF

Table 1-2A Model MT3809/MT3810 Capacities, Pressure Drop and Viscosity Immunity Ceiling

METER SIZE	CONNECTION SIZE DIN DN mm	CONNECTION SIZE ANSI inches	FLOAT CODE	FLOAT MATERIAL STAINLESS STEEL 316L, TITANIUM FLOAT METER SIZE 0 WATER [3] l/h	WATER gph	AIR [1,2] scfh	AIR nl/h	Press Drop mbar	Press Drop inches WC	VIC (cSt) (cSt)	Max. Visc (cSt)	PED Category
0	15	1/2"	0	0.96	0.25	1.6	44	12	5	1	5	SEP
1			0	1.3	0.34	2.1	59	12	5	1	10	SEP
2			0	3.6	0.96	4.9	130	12	5	1	20	SEP
3			0	10	2.8	12	350	12	5	1	35	SEP
4			0	21	5.5	23	650	32	13	1	70	SEP
5			0	42	11	53	1400	38	15	1	100	SEP

1. Air flows in scfh are given at 70°F and 14.7 psia 2. Air flows in nl/h are given at 0°C and 1.013 bar (a) 3. Water flows in l/h & gpm are given at 70°F

METER SIZE	CONNECTION SIZE DIN DN mm	CONNECTION SIZE ANSI inches	FLOAT CODE	FLOAT MATERIAL STAINLESS STEEL 316L WATER [4] l/h	WATER gpm	AIR [1,2] scfm	AIR nm3/h	Press Drop mbar	Press Drop inches WC	VIC (cSt) (cSt)	Max. Visc (cSt)	PED Category
7	15	1/2"	A	25	0.11	0.49	0.8	30	13	1	40	SEP
			B*	65	0.28	1.2	2.1	30	13	1	20	SEP
			C	130	0.59	2.4	3.9	30	13	1	120	SEP
			D*	200	0.88	3.7	6.1	35	15	1	20	SEP
8	15	1/2"	A	250	1.1	5.2	8.5	45	19	2	250	SEP
			B	400	1.7	7.7	12	55	23	1	180	SEP
			C	650	2.8	11	19	60	25	2	475	SEP
			D	1000	4.4	21	35	130	53	1.5	250	SEP
10	25	1"	A	1200	5.2	19	31	60	25	5	300	CAT I, II or III
			B	1500	6.6	31	51	70	29	1.5	300	CAT I, II or III
			C	2400	10	41	68	85	35	7	300	CAT I, II or III
			D	3500	15	65	100	155	63	4	300	CAT I, II or III
12	40	1 1/2"	A	4000	17	67	100	50	21	50	300	CAT I, II or III
			B	6000	26	95	150	60	25	30	300	CAT I, II or III
			C	8000	35	150	240	150	61	2	300	CAT I, II or III
			D	10000	46	210	340	300	121	2	300	CAT I, II or III
13	50	2"	A	6500	28	100	160	50	21	50	300	CAT I, II or III
			B	9500	41	160	260	60	25	50	300	CAT I, II or III
			C	12000	55	200	330	100	41	2.5	300	CAT I, II or III
			D	20000	88	390	650	300	121	1	-	CAT I, II or III
15	80	3"	A	20000	88	390	640	110	45	8	-	CAT I, II or III
			B	30000	130	550	900	140	57	7	-	CAT I, II or III
			C	40000	170	750	1200	280	113	5	-	CAT I, II or III
16	100	4"	A	49000	210	NA	NA	160	65	15	-	CAT I, II or III
			B	70000	300	NA	NA	210	85	10	-	CAT I, II or III
			C	100000	440	NA	NA	300	121	5	-	CAT I, II or III

1. Air flows in scfm are given at 70°F and 14.7 psia 2. Air flows in nm3/h are given at 0°C and 1.013 bar (a)
3. *Minimum operating pressure required 7 psig / 0.48 bar 4. Water flows in l/h & gpm are given at 70°F

Table 1-2B Model MT3809 ETFE Lined Capacities, Pressure Drop and Viscosity Immunity Ceiling

METER SIZE	CONNECTION SIZE DIN DN mm	CONNECTION SIZE ANSI inches	TUBE FLOAT CODE	STANDARD FLOAT MATERIAL CAPACITIES (See Note 3) WATER [5] l/h	WATER gpm	AIR [1,2,4] scfm	AIR nm3/h	Press Drop mbar	Press Drop inches WC	PED Category
7	15	1/2"	GA	110	0.48	2.2	3.7	25	11	SEP
			GB	170	0.75	3.5	5.8	50	21	SEP
8	15	1/2"	A	250	1.1	5.1	8.3	30	13	SEP
			B	420	1.8	8.5	13	45	19	SEP
			C	500	2.2	9.9	16	40	17	SEP
			D	850	3.7	18	30	130	53	SEP
10	25	1"	A	1400	6.2	27	45	45	19	CAT I, II or III
			B	2000	8.8	39	63	106	43	CAT I, II or III
			C	2400	10	47	77	90	37	CAT I, II or III
			D	3000	13	58	95	130	53	CAT I, II or III
12	40	1 1/2"	A	3000	13	58	95	50	21	CAT I, II or III
			B	4000	18	73	120	75	31	CAT I, II or III
			C	5000	22	94	150	85	35	CAT I, II or III
			D	6000	26	110	180	120	49	CAT I, II or III
13	50	2"	A	6000	26	110	180	95	39	CAT I, II or III
			B	8000	35	150	250	125	51	CAT I, II or III
			C	12000	53	220	370	200	81	CAT I, II or III
			D	15000	66	280	470	225	91	CAT I, II or III

1. Air flows in scfm are given at 70°F and 14.7 psia 2. Air flows in nm3/h are given at 0°C and 1.013 bar (a)
3. Sizes 7 & 8 floats are Hastelloy C-276 (Density = 8.94 kg/dm^3), Sizes 10, 12 & 13 are PVDF (Density = 4.22 kg/dm^3)
4. For gas applications operating pressure must be greater than 29 PSIA / 2 bar (a)
5. Water flows in l/h & gpm are given at 70°F

Table 1-3A Model MT3809/MT3810 Pressure Ratings, Flanged

Flanged - 150LBS, ANSI*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	275	19.0			290	20.0
-75	-59	275	19.0	234	16.1	290	20.0
212	100	235	16.2	200	13.8	257	17.7
392	200	199	13.7	139	9.6	200	13.8
572	300	148	10.2	88	6.1	148	10.2
617	325			81	5.6		
752	400	94	6.5			94	6.5

Flanged - 300LBS, ANSI*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	720	49.6			750	51.7
-75	-59	720	49.6	612	42.2	750	51.7
212	100	612	42.2	521	35.9	747	51.5
392	200	518	35.7	363	25.0	701	48.3
572	300	458	31.6	276	19.0	622	42.9
617	325			268	18.5		
752	400	426	29.4			529	36.5

*** Meter sizes 15 and 16 have a Minimum Temperature of -150°F/-101°C**

Flanged - 600LBS, ANSI*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	1440	99.3			1500	103.4
-75	-59	1440	99.3	1224	84.4	1500	103.4
212	100	1224	84.4	1040	71.7	1494	103.0
392	200	1034	71.3	724	49.9	1403	96.7
572	300	917	63.2	550	37.9	1243	85.7
617	325			538	37.1		
752	400	854	58.9			1063	73.3

Note: Flanged ELF O-ring is Kalrez 4079.

Flanged - PN16, EN-1092*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	232	16.0			232	16.0
-75	-59	232	16.0	197	13.6	232	16.0
212	100	196	13.5	167	11.5	232	16.0
392	200	160	11.0	112	7.7	232	16.0
572	300	139	9.6	84	5.8	223	15.4
752	400	129	8.9			173	11.9

Flanged - PN40, EN-1092*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	580	40.0			580	40.0
-75	-59	580	40.0	493	34.0	580	40.0
212	100	490	33.8	416	28.7	580	40.0
392	200	400	27.6	280	19.3	580	40.0
572	300	348	24.0	209	14.4	557	38.4
752	400	322	22.2			431	29.7

Flanged - 10K, JIS B2220*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	203	14.0			203	14.0
-75	-59	203	14.0	173	11.9	203	14.0
212	100	203	14.0	173	11.9	203	14.0
392	200	174	12.0	122	8.4	174	12.0
572	300	145	10.0	87	6.0	145	10.0

Flanged - 20K, JIS B2220*

Temperature		316/316L		Titanium Gr.2		Alloy C-276/625	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	493	34.0			493	34.0
-75	-59	493	34.0	419	28.9	493	34.0
212	100	493	34.0	419	28.9	493	34.0
392	200	450	31.0	315	21.7	450	31.0
572	300	421	29.0	252	17.4	421	29.0
752	400	334	23.0			334	23.0

Table 1-3B Model MT3809/MT3810 Pressure Ratings, NPT Female

NPT - Female - Standard Design (Teflon O-rings)
316/316L

Temperature		#7/8		#10		#12		#13	
°F	°C	psi	Bar	psi	Bar	psi	Bar	psi	Bar
-58 to 100	-50 to 38	2567	177	2321	160	1929	133	1740	120
212	100	2190	151	1973	136	1653	114	1479	102
392	200	1842	127	1668	115	1392	96	1247	86
482	250	1726	119	1552	107	1291	89	1160	80

NPT - Female - ELF - 2500LBS Design
316/316L

Temperature		ELF	
°F	°C	psi	Bar
-58 to 100	-50 to 38	6000	414
212	100	5100	351.6
392	200	4311	297.2
572	300	3822	263.5

NPT - Female - 7-12 - 2500LBS Design
316/316L

Temperature		#7-12	
°F	°C	psi	Bar
-31 to 100	-35 to 38	6000	413.7
212	100	5100	351.6
392	200	4311	297.2
550	288	3822	263.5

NPT - Female - Standard Design (Teflon O-rings)
Titanium Gr. 2

Temperature		#7/8		#10		#12		#13	
°F	°C	psi	Bar	psi	Bar	psi	Bar	psi	Bar
-58 to 100	-50 to 38	2147	148	1929	133	1610	111	1450	100
212	100	1813	125	1639	113	1363	94	1233	85
392	200	1334	92	1204	83	1001	69	899	62
482	250	1160	80	1044	72	870	60	783	54

NPT - Female - ELF - 2500LBS Design
Titanium Gr. 2

Temperature		ELF	
°F	°C	psi	Bar
-58 to 100	-50 to 38	5100	352
212	100	4335	298.9
392	200	3017	208.0
572	300	2293	158.1

NPT - Female - 7-12 - 2500LBS Design
Titanium Gr. 2

Temperature		#7-12	
°F	°C	psi	Bar
-31 to 100	-35 to 38	5100	351.6
212	100	4335	298.9
392	200	3017	208.0
550	288	2293	158.1

NPT - Female - Standard Design (Teflon O-rings)
Hastelloy Alloy C-276

Temperature		#7/8		#10		#12		#13	
°F	°C	psi	Bar	psi	Bar	psi	Bar	psi	Bar
-58 to 100	-50 to 38	3510	242	3162	218	2640	182	2379	164
212	100	3162	218	2857	197	2379	164	2147	148
392	200	2756	190	2480	171	2074	143	1871	129
482	250	2582	178	2335	161	1944	134	1755	121

NPT - Female - ELF - 2500LBS Design
Alloy C-276/ Alloy 625

Temperature		ELF	
°F	°C	psi	Bar
-58 to 100	-50 to 38	6250	431
212	100	6228	429.4
392	200	5842	402.8
572	300	5179	357.1

NPT - Female - 7-12 - 2500LBS Design
Alloy C-276/ Alloy 625

Temperature		#7-12	
°F	°C	psi	Bar
-31 to 100	-35 to 38	6250	430.9
212	100	6228	429.4
392	200	5842	402.8
550	288	5179	357.1

NPT - Female - Standard Design (Teflon O-rings)
Inconel Alloy 625

Temperature		#7/8		#10		#12		#13	
°F	°C	psi	Bar	psi	Bar	psi	Bar	psi	Bar
-58 to 100	-50 to 38	4047	279	3640	251	3046	210	2741	189
212	100	4047	279	3640	251	3046	210	2741	189
392	200	3902	269	3510	242	2930	202	2640	182
482	250	3800	262	3423	236	2857	197	2567	177

Female ELF - 2500LBS Design: O-ring is Kalrez 4079
Female Sizes 7-12 - 2500LBS Design: O-ring is Kalrez 3018

Table 1-3C Model MT3809/MT3810 Pressure Ratings, NPT Male

NPT - Male - Standard Design							
316/316L							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	4699	324	3785	261	3684	254
100	38	4699	324	3785	261	3684	254
212	100	4018	277	3234	223	3147	217
392	200	3379	233	2712	187	2654	183
572	300	3002	207	2408	166	2350	162
752	400	2785	192	2248	155	2190	151

NPT - Male - Standard Design							
Hastelloy Alloy C-276							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	4989	344	5163	356	5033	347
100	38	4989	344	5163	356	5033	347
212	100	4511	311	4670	322	4540	313
392	200	3931	271	4061	280	3960	273
572	300	3466	239	3597	248	3495	241
752	400	3176	219	3292	227	3205	221

NPT - Male - Standard Design							
Titanium Gr. 2							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-75	-59	3046	210	3147	217	3075	212
100	38	3046	210	3147	217	3075	212
212	100	2596	179	2683	185	2611	180
392	200	1900	131	1973	136	1914	132
572	300	1450	100	1494	103	1450	100
617	325	1349	93	1407	97	1363	94

NPT - Male - Standard Design							
Inconel Alloy 625							
Temperature		#7/8		#10		#12	
°F	°C	psi	Bar	psi	Bar	psi	Bar
-325	-198	5758	397	5961	411	5802	400
100	38	5758	397	5961	411	5802	400
212	100	5758	397	5961	411	5802	400
392	200	5540	382	5729	395	5584	385
572	300	5279	364	5453	376	5323	367
752	400	5062	349	5236	361	5105	352

NPT - Male - ELF - 2500LBS Design*			
316/316L			
Temperature		ELF	
°F	°C	psi	Bar
-58 to 122	-50 to 50	6000	414
212	100	5100	351.6
392	200	4311	297.2
572	300	3822	263.5

NPT - Male - ELF - 2500LBS Design*			
Titanium Gr. 2			
Temperature		ELF	
°F	°C	psi	Bar
-58 to 122	-50 to 50	5100	352
212	100	4335	298.9
392	200	3017	208.0
572	300	2293	158.1

NPT - Male - ELF - 2500LBS Design*			
Alloy C-276/ Alloy 625			
Temperature		ELF	
°F	°C	psi	Bar
-58 to 122	-50 to 50	6250	431
212	100	6228	429.4
392	200	5842	402.8
572	300	5179	357.1

* ELF 2500# Design (Kalrez 4079)

Table 1-4 Temperature Cut-off Tables

Meter with 316 SS Mechanical Indicator

	Process Temperature		Ambient Temperature	
Connection type	°C	°F	°C	°F
Flanged / MNPT	-198 to 420	-325 to 788	-55 to 75	-67 to 167
Threaded female	-50 to 300*	-58 to 572*	-55 to 75	-67 to 167
ETFE lined	-30 to 150	-22 to 302	-30 to 40	-22 to 104

Meter with Aluminum Mechanical Indicator

	Process Temperature		Ambient Temperature	
Connection type	°C	°F	°C	°F
Flanged / MNPT	-198 to 300	-325 to 572	-55 to 75	-67 to 167
Threaded female	-50 to 300*	-58 to 572*	-55 to 75	-67 to 167
ETFE lined	-30 to 150	-22 to 302	-30 to 40	-22 to 104

Ambient Temperatures with Electrical Components

Option	°C	°F
Transmitter	-40 to 70	-40 to 158
Transmitter w/display	-20 to 70	-4 to 158
Inductive switches	-40 to 70	-40 to 158

Insulation required when process temperatures are greater than 300°C/572°F.
Refer to Instruction Manual for details

Meter with Electrical Components - Ambient Temperature 30°C / 86°F

	Process Temperature	
Connection type	°C	°F
Transmitter	-198 to 420	-325 to 788
Transmitter w/display	-198 to 420	-325 to 788
Inductive switches	-198 to 420	-325 to 788

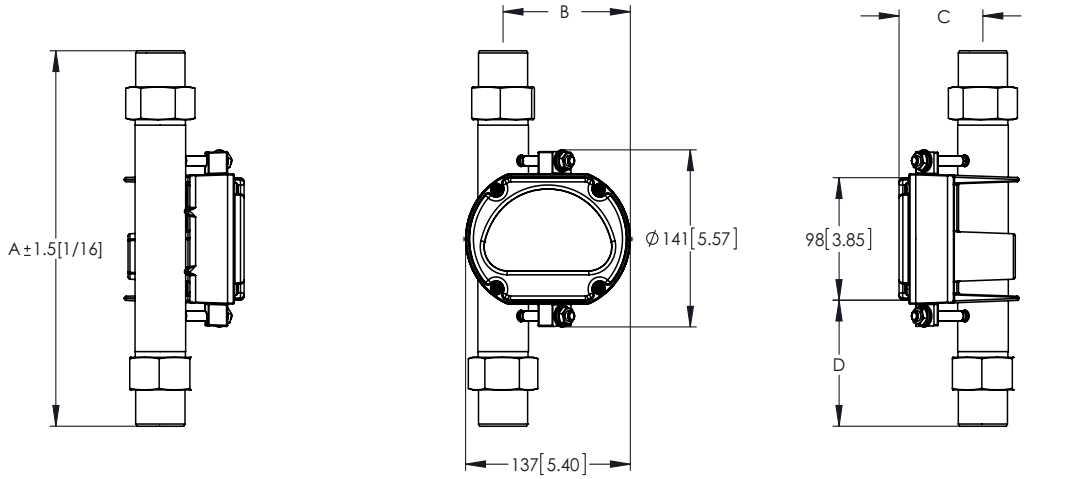
Meter with Electrical Components - Ambient Temperature 60°C / 140°F

	Process Temperature	
Connection type	°C	°F
Transmitter	-198 to 200	-325 to 392
Transmitter w/display	-198 to 175	-325 to 350
Inductive switches	-198 to 200	-325 to 392

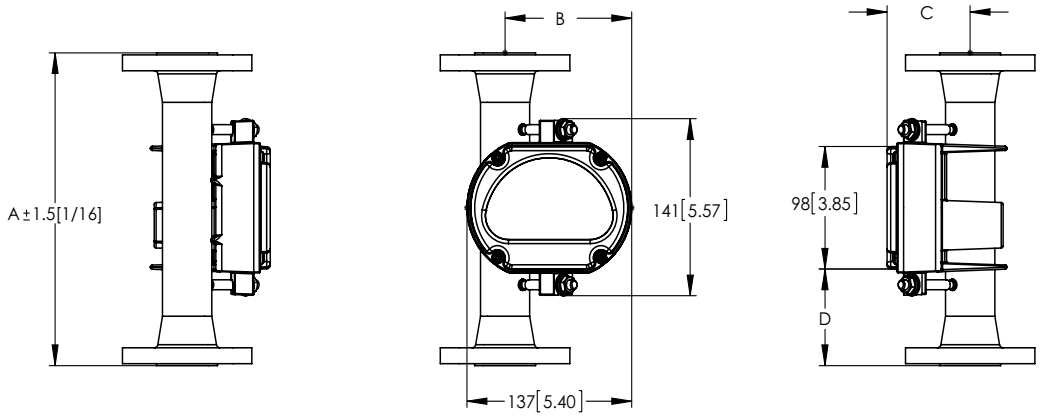
*

	Minimum Temperature		Maximum Temperature	
Elastomer Materials	**°F**	**°C**	**°F**	**°C**
Kalrez 4079	-58	-50	572	300
Kalrez 3018	-31	-35	550	288
Teflon PTFE	-58	-50	482	250
Viton A	5	-15	400	204
Teflex (Viton core, FEP jacket)	5	-15	400	204

Model 3809 & 3810 General Purpose Indicator Housing with Threaded Female St'd Connections mm [inches]



Model 3809 & 3810 General Purpose Indicator Housing with Flanged Connections mm [inches]

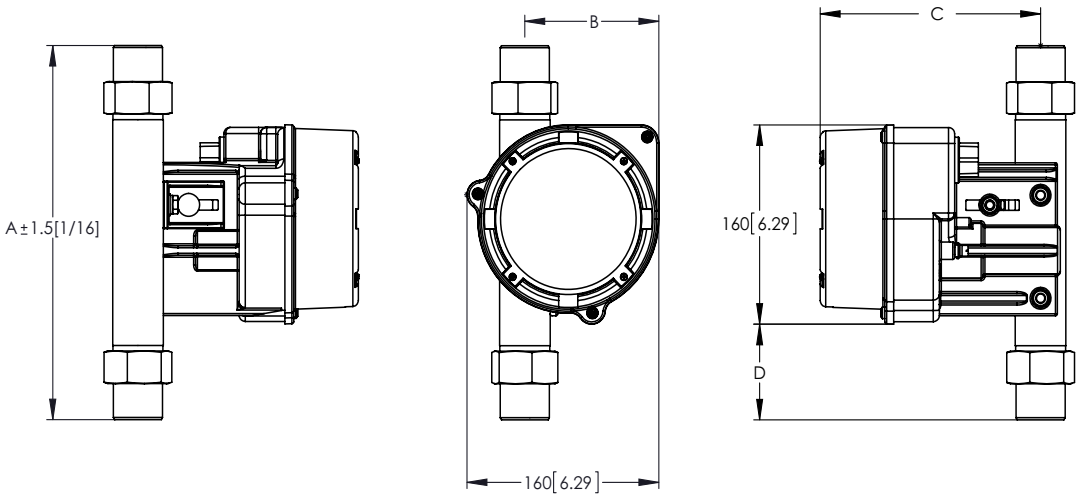


Meter Size	Connection	A	B	C	D	Weight (Approx.)**
0-5	1/2" Threaded Female St'd	225 [8.85]*	99 [3.90]	63 [2.48]	76 [2.98]	2.7 kg [6 lbs.]
7 & 8	1/2" Threaded Female St'd	225 [8.85]*	99 [3.90]	63 [2.48]	76 [2.98]	2.7 kg [6 lbs.]
10	1" Threaded Female St'd	300 [11.81]*	107 [4.21]	71 [2.80]	76 [2.98]	4.5 kg [10 lbs.]
12	1-1/2" Threaded Female St'd	300 [11.81]*	116 [4.57]	80 [3.15]	76 [2.98]	6.8 kg [15 lbs.]
13	2" Threaded Female St'd	300 [11.81]*	122 [4.78]	86 [3.39]	76 [2.98]	7.7 kg [17 lbs.]
0-5	1/2" Flange	250 [9.84]	99 [3.90]	63 [2.48]	76 [2.98]	4.1 kg [9 lbs.]
7 & 8	1/2" Flange	250 [9.84]	99 [3.90]	63 [2.48]	76 [2.98]	4.1 kg [9 lbs.]
10	1" Flange	250 [9.84]	106 [4.18]	70 [2.76]	76 [2.98]	7.7 kg [17 lbs.]
12	1-1/2" Flange	250 [9.84]	115 [4.54]	79 [3.12]	76 [2.98]	12.2 kg [27 lbs.]
13	2" Flange	250 [9.84]	121 [4.63]	85 [3.36]	76 [2.98]	14.1 kg [31 lbs.]
15	3" Flange	250 [9.84]	139 [5.46]	103 [4.05]	76 [2.98]	20.0 kg [44 lbs.]
16	4" Flange	350 [13.78]	152 [5.98]	118 [4.65]	126 [4.95]	37.6 kg [83 lbs.]

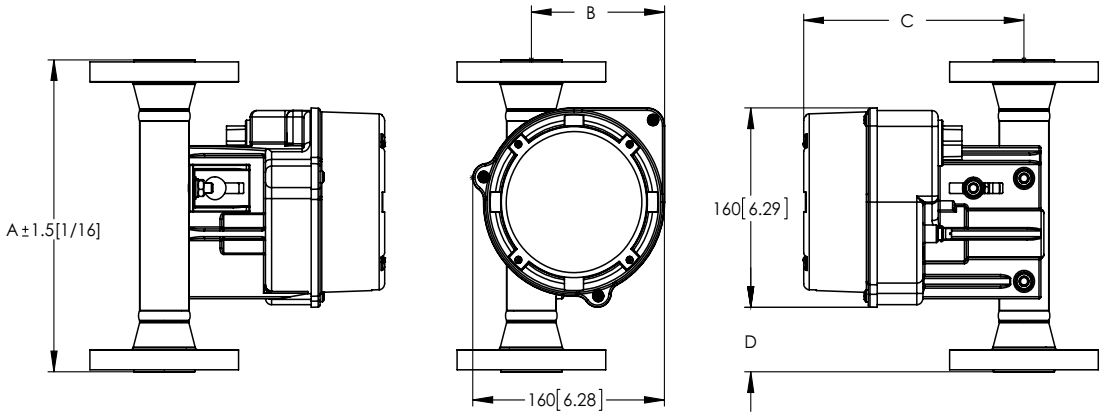
* Dimensions apply to threaded female standard connections only.
** Weights shown for aluminum indicator. Add 1.8 kg [4 lbs.] for steel indicator housing.

Figure 1-1 Model MT3809 and MT3810 Dimensional Drawings (mm/in) and Weights (kg/lbs) - General Purpose Housing

Model 3809 Intrinsically Safe Indicator Housing with
Threaded Female St'd Connections mm [inches]



Model 3809 Intrinsically Safe Indicator Housing with
Flanged Connections mm [inches]

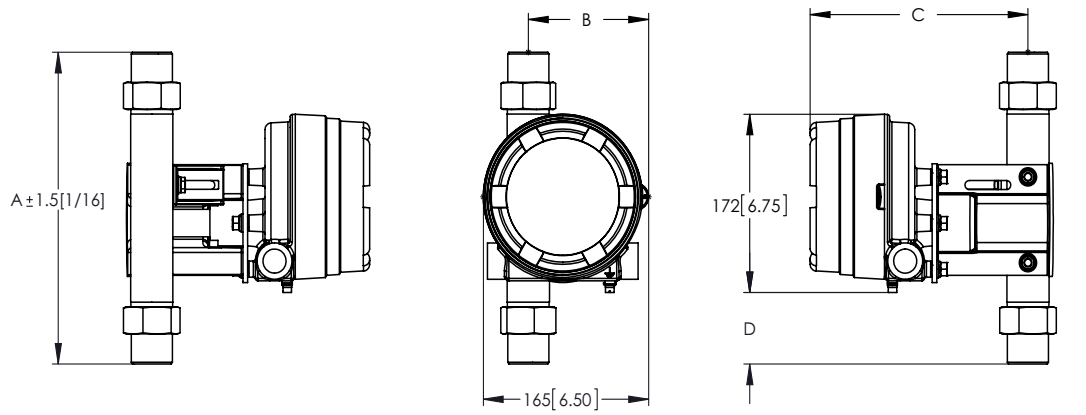


Meter Size	Connection	A	B	C	D	Weight (Approx.)
0-5	1/2" Threaded Female St'd	225 [8.85]*	104 [4.09]	182 [7.17]	52 [2.04]	5.4 kg [12 lbs.]
7 & 8	1/2" Threaded Female St'd	225 [8.85]*	104 [4.09]	182 [7.17]	52 [2.04]	5.4 kg [12 lbs.]
10	1" Threaded Female St'd	300 [11.81]*	112 [4.41]	182 [7.17]	52 [2.04]	7.3 kg [16 lbs.]
12	1-1/2" Threaded Female St'd	300 [11.81]*	121 [4.76]	182 [7.17]	52 [2.04]	9.5 kg [21 lbs.]
13	2" Threaded Female St'd	300 [11.81]*	127 [5.00]	182 [7.17]	52 [2.04]	10.4 kg [23 lbs.]
0-5	1/2" Flange	250 [9.84]	104 [4.09]	182 [7.17]	52 [2.04]	6.8 kg [15 lbs.]
7 & 8	1/2" Flange	250 [9.84]	104 [4.09]	182 [7.17]	52 [2.04]	6.8 kg [15 lbs.]
10	1" Flange	250 [9.84]	111 [4.37]	182 [7.17]	52 [2.04]	10.4 kg [23 lbs.]
12	1-1/2" Flange	250 [9.84]	120 [4.73]	182 [7.17]	52 [2.04]	15.0 kg [33 lbs.]
13	2" Flange	250 [9.84]	126 [4.97]	182 [7.17]	52 [2.04]	16.8 kg [37 lbs.]
15	3" Flange	250 [9.84]	144 [5.67]	182 [7.17]	52 [2.04]	22.7 kg [50 lbs.]
16	4" Flange	350 [13.78]	159 [6.26]	182 [7.17]	102 [4.00]	40.4 kg [89 lbs.]

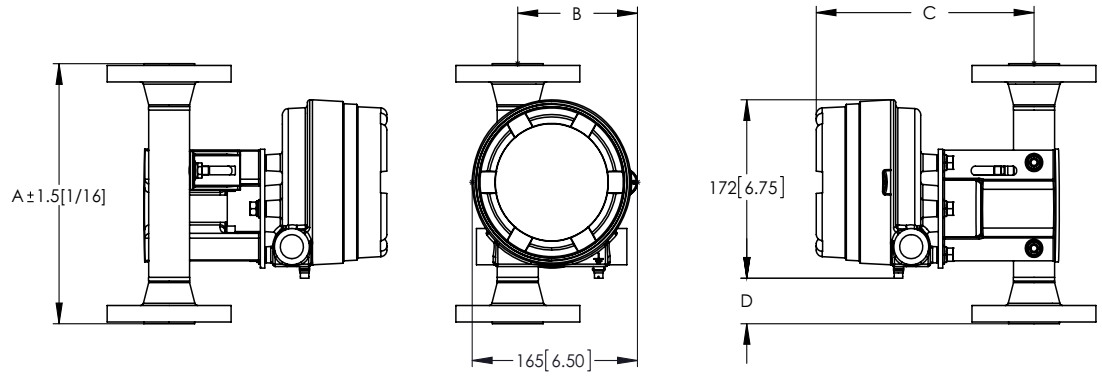
* Dimensions apply to threaded female standard connections only.

Figure 1-2 Model MT3809 and MT3810 Dimensional Drawings (mm/in) and Weights (kg/lbs) - Intrinsically Safe Housing

Model 3809 Explosion Proof Indicator Housing with
Threaded Female St'd Connections mm [inches]



Model 3809 Explosion Proof Indicator Housing with
Flanged Connections mm [inches]



Meter Size	Connection	A	B	C	D	Weight (Approx.)
0-5	1/2" Threaded Female St'd	225 [8.85]*	112 [4.41]	218 [8.57]	44 [1.72]	11.8 kg [26 lbs.]
7 & 8	1/2" Threaded Female St'd	225 [8.85]*	112 [4.41]	218 [8.57]	44 [1.72]	11.8 kg [26 lbs.]
10	1" Threaded Female St'd	300 [11.81]*	120 [4.73]	218 [8.57]	44 [1.72]	13.6 kg [30 lbs.]
12	1-1/2" Threaded Female St'd	300 [11.81]*	129 [5.08]	218 [8.57]	44 [1.72]	15.9 kg [35 lbs.]
13	2" Threaded Female St'd	300 [11.81]*	135 [5.31]	218 [8.57]	44 [1.72]	16.8 kg [37 lbs.]
0-5	1/2" Flange	250 [9.84]	113 [4.45]	218 [8.57]	44 [1.72]	13.2 kg [29 lbs.]
7 & 8	1/2" Flange	250 [9.84]	113 [4.45]	218 [8.57]	44 [1.72]	13.2 kg [29 lbs.]
10	1" Flange	250 [9.84]	120 [4.73]	218 [8.57]	44 [1.72]	16.8 kg [37 lbs.]
12	1-1/2" Flange	250 [9.84]	129 [5.08]	218 [8.57]	44 [1.72]	21.3 kg [47 lbs.]
13	2" Flange	250 [9.84]	135 [5.31]	218 [8.57]	44 [1.72]	23.1 kg [51 lbs.]
15	3" Flange	250 [9.84]	153 [6.02]	218 [8.57]	44 [1.72]	29.0 kg [64 lbs.]
16	4" Flange	350 [13.78]	168 [6.61]	218 [8.57]	94 [3.69]	46.7 kg [103 lbs.]

* Dimensions apply to threaded female standard connections only.

Figure 1-3 Model MT3809 and MT3810 Dimensional Drawings (mm/in) and Weights (kg/lbs) - Explosion Proof Housing

1-4 Optional Accessories

Needle valves and flow controllers may be externally piped into the inlet or outlet side of the instrument. Needle valves can be supplied up to size 12 1-1/2" maximum 10000 l/hr / 46 gpm water equivalent. Needle valves and flow controllers will be supplied separately with the flanged meter.

1-5 Optional Electronic Equipment

Electronic equipment available with the models MT3809 and MT3810 including:

- 1-5-1 Transmitter with or without Alarms, Display and Pulse Output
- 1-5-2 Inductive Alarms
- 1-5-3 Microprocessor Transmitter with or without Inductive Alarms

Refer to the following sections for additional information. All models are designed to be either intrinsically safe or explosion proof.

1-5-1 Transmitter with or without Alarms, Display and Pulse Output

Design Features

A 2-wire, loop-powered device for ease of wiring and installation

- 4-20 mA analog output for flowrate, with Bell-202 modulated HART communication channel
- User selectable 0% and 100% analog output ranges with optional smoothing
- Flexible (mix & match) units of measure for flowrates, totals, temperatures, densities, etc.
- Two flow totalizers: Resettable and inventory totalization
- User configurable, scaleable pulse output for various engineering units
- Comprehensive alarms for both process flow and internal diagnostic checks
- Easily configured and compatible with other plant equipment

Description

The transmitter (with or without the alarms, display and pulse output) is a compact microprocessor device designed to interface directly with the Model MT3809.

The transmitter is HART-programmable for numerous variables such as flow rate, totalization, calibration factors, and high-low alarm parameters. It is programmable with easy-to-use hand held configurators. Prior to shipment, commonly used default values are programmed by Brooks to ensure ease of operation and quick startup. However, parameters may be reprogrammed by the user if needed flow rate information may be viewed locally at the meter scale, LCD display or displayed remotely.

Table 1-5 Approval Certificates

Declarations	Model Type	Applicable Standards/ Directives	Certificate/Status
EC Declaration CE	All	EMC Directive (2004/108/EC)	Approved
		RoHS Directive (2011/65/EU)	Approved
		Pressure Equipment Directive (97/23/EC)	Approved
SIL Declaration	Meters with Inductive Alarm	IEC 61508-2: 2010	Approved
SIL Declaration	Meters with Transmitter	IEC 61508-2: 2010	PENDING
NAMUR Declaration	Electrical Meters	NAMUR NE21, NE43	Approved
IP66/67	Indicator Only Meter	IEC 60529	Approved
NEMA 4X - Watertight	Indicator Only Meter	NEMA 250	Approved
CRN	All	ASME 31.3	Approved
Surge Immunity Declaration	Meters with Transmitter	IEC 61000-4-5	Approved
EAC	All	Customs Union – Russia: TR CU 032/2013 "On safety of the equipment operating under excessive pressure"	TC N RU Д-U.AY04.B.05988

Table 1-6 Hazardous Location Certification: Flame Proof (Exd)

Model Type : Flame Proof (Exd)

Ambient -40°C to 70°C, IP66/67, NEMA 4X

Mark	Approvals	Approval Marking	Certificate/Status
C SP US	CSA	Ex d IIC T6 Gb / Class I, Div.1 Group A, B, C and D Ex tb IIIC T85 Db / Class II, Div.1, Groups E, F, and G Class I, Zone 1, AEx d IIC T6 Gb / Zone 21, AEx tb IIIC T85 Db	14.2628516
Ex	ATEX	II 2 G Exd IIC T6..T1 Gb II 2 D Ex tb IIIC T85°C…T400°C Db EN 60079-0:2012, EN 60079-1:2007, EN 60079-31:2009	DEKRA 13ATEX0086X
	IECEx	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C…T400°C Db IEC 60079-0:2011, IEC 60079-1: 2007-04, IEC 60079-31:2008	IECEx DEK13.0027X
EAC	Customs Union – Russia	TR CU 012/2011 1 Ex d IIC «T6…T1» GbX : Ex tb IIIC «T85°C…T400°C» Db X	RU C-HU.ГБ08.B.00741
Ex NEPSI	NEPSI	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C…T400°C Db	GYJ14.1304X
	CCOE	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C…T400°C Db	CCEs P349406/1
KCs	KOSHA	Exd IIC T6..T1 Gb : Ex tb IIIC T85°C…T400°C Db	15-AV4BO-0353

Special conditions for safe use (ATEX/IECEX)

For information regarding the dimension of the flameproof joints the manufacturer shall be contacted.

Table 1-7 Process and Ambient Temperature Limits: Flame Proof (Exd)

Process and Ambient Temperature limits

Temperature Class	T6	T5	T4	T3	T2	T1
Maximum Ambient Temperature	≤ 70	≤ 70	≤ 65	≤ 58	≤ 47	≤ 32.5
Maximum Process Temperature (°C)	85	100	135	200	300*	420*

* For application with process temperature equal to or greater than 300°C heat shield and customer supplier installation required. Please refer to installation manual for details

Additional limitations by model type:

Model	Maximum Process Temperature (°C)
Meters with Flanges or Male Threads	420°C
Meters with Female Threads	300°C
ELF Meters	300°C
ETFE Lined Meters	150°C

Table 1-8 Hazardous Location Certification: Intrinsic Safety (ia) / Non-sparking (nA) / Enclosure Dust (tc)

Model Type : Intrinsic safety (ia) / non-sparking (nA) / Enclosure dust (tc)
Ambient -40°C to 70°C,
Aluminum Housing – IP64, Stainless Steel Housing – IP66/67

	ATEX IECEx	*M1*	*M2*	*M1 = Apparatus with Transmitter M2 = Apparatus with Inductive Alarm* *Units without Digital Display* *Aluminum housing* ✓ ✓ II 2 G Ex ia IIC T6…T4 Gb : II 2 D Ex ia IIIC T 85°C…T135°C Db ✓ II 3 G Ex nA IIC T6…T4 Gc : II 3 D Ex ic IIIC T 85°C…T135°C Dc ✓ II 3 G Ex ic IIC T6…T4 Gc : II 3 D Ex ic IIIC T 85°C…T135°C Dc *Stainless Steel housing* ✓ ✓ II 2 G Ex ia IIC T6…T3 Gb : II 2 D Ex ia IIIC T 85°C…T200°C Db ✓ II 3 G Ex nA IIC T6…T3 Gc : II 3 D Ex ic IIIC T 85°C…T200°C Dc ✓ II 3 G Ex ic IIC T6…T3 Gc : II 3 D Ex ic IIIC T 85°C…T200°C Dc *Stainless Steel High Temp housing* ✓ ✓ II 2 G Ex ia IIC T6…T2 Gb : II 2 D Ex ia IIIC T 85°C…T300°C Db ✓ II 3 G Ex nA IIC T6…T2 Gc : II 3 D Ex ic IIIC T 85°C…T300°C Dc ✓ II 3 G Ex ic IIC T6…T2 Gc : II 3 D Ex ic IIIC T 85°C…T300°C Dc *Units with Digital Display* *Aluminum housing* ✓ ✓ II 2 G Ex ia IIC T4 Gb : II 2 D Ex ia IIIC T135°C Db ✓ II 3 G Ex nA IIC T4 Gc : II 3 D Ex ic IIIC T135°C Dc ✓ II 3 G Ex ic IIC T4 Gc : II 3 D Ex ic IIIC T135°C Dc *Stainless Steel housing* ✓ ✓ II 2 G Ex ia IIC T4…T3 Gb : II 2 D Ex ia IIIC T 135°C…T200°C Db ✓ II 3 G Ex nA IIC T4…T3 Gc : II 3 D Ex ic IIIC T 135°C…T200°C Dc ✓ II 3 G Ex ic IIC T4…T3 Gc : II 3 D Ex ic IIIC T 135°C…T200°C Dc *Stainless Steel High Temp housing* ✓ ✓ II 2 G Ex ia IIC T4…T2 Gb : II 2 D Ex ia IIIC T 135°C…T300°C Db ✓ II 3 G Ex nA IIC T4…T2 Gc : II 3 D Ex ic IIIC T 135°C…T300°C Dc ✓ II 3 G Ex ic IIC T4…T2 Gc : II 3 D Ex ic IIIC T 135°C…T300°C Dc EN 60079-0:2012+ A11, EN 60079-11:2012, EN 60079-15:2010 IEC 60079-0:2011, IEC 60079-11:2011, IEC 60079-15:2010	DEKRA 13ATEX0106 X DEKRA 13ATEX0107 X IECEx DEK13.0045 X
	UL USL, CNL	Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III Hazardous Locations Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; Class III Hazardous Locations Class I, Zone 1, AEx ia IIC T2/T3/T4/T5/T6 Gb Zone 21, AEx ia IIIC T85°C/T100°C/T135°C/T200°C/T300°C Db Class I, Zone 2, AEx nA IIC T2/T3/T4/T5/T6 Gc Zone 22, AEx tc IIIC T85°C/T100°C/T135°C/T200°C/T300°C Dc				E73889
	Customs Union – Russia	TR CU 012/2011 "On safety of the equipment for work in explosive environments" Zone 1 / Zone2 - Intrinsic safety ia/ic, Zone 2 non-sparking (nA)			RU C-HU.ГБ08.В.00741
	NEPSI	Zone 1 - Intrinsic safety (ia), Zone 2 non-sparking (nA/ic)			GYJ15.1039X GYJ15.1040X
	CCOE	Zone 1 - Intrinsic safety (ia), Zone 2 non-sparking (nA)			PENDING
	KOSHA	Zone 1 - Intrinsic safety (ia), Zone 2 non-sparking (nA)			PENDING

Special conditions for safe use

Because part of flowmeter enclosure is made of plastic materials, if it is mounted in an area where the use of Gb/Gc or Db/Dc apparatus is required, it must be installed such, that, ignition sources due to electrostatic discharge sparks are excluded.

Because part of flowmeter enclosure is made of painted aluminum, if it is mounted in an area where the use of Db/Dc apparatus is required, it must be installed such, that, ignition sources due to propagating brush discharge sparks are excluded

For ambient temperature limitations refer to temperature table.

The electronic circuit is in galvanic connection with enclosure frame earth.

The Gb and Db apparatus makes use of the Annex F requirements from IEC 60079-11.

On units with digital display the programming function through the LCD display shall only be done outside the hazardous area.

Table 1-9 Electrical Data: Intrinsic Safety (ia/ic)

	Ui,V	**Ii, mA**	**Pi, mW**	**Ci, nF**	**Li, µH**	**Recommended Barrier #**
Signal 4-20mA (J1 terminals 12+ and 13-)	28	75	525	2,2	0.365	Stahl Type : 9001/01-280-075-101
Pulse output (J1 terminals 7+ and 8-)	28	84	660	≈0	≈0	Stahl Type : 9002/77-280-094-001
Alarm circuits A (J1 terminals 1+ and 2-)	10,6	19,1	51	≈0	≈0	Pepperl & Fuchs: KFA5-SR2-EX2.W KFA6-SR2-EX2.W
	10,5	13	34	≈0	≈0	Pepperl & Fuchs: KFD2-SR2-EX2.W
Alarm circuits B (J1 terminals 4+ and 5-)	10,6	19,1	51	≈0	≈0	Pepperl & Fuchs: KFA5-SR2-EX2.W KFA6-SR2-EX2.W
	10,5	13	34	≈0	≈0	Pepperl & Fuchs: KFD2-SR2-EX2.W
	Uo,V	Io, mA	Po, mW	Ci, nF	Li, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	≈0	≈0	ATEX/IECEx Certification
	Uo,V	Io, mA	Po, mW	Co, µF	Lo, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	0.083	44.0	UL Certification
	Ui,V	Ii, mA	Pi, mW	Ci, nF	Li, µH	Recommended Barrier #
Inductive High Alarm circuits (terminals «+» and «-») – for connection of circuits Pepperl+Fuchs mod. SJ 3,5-SN type 2	10,6	19,1	51	30	100	Pepperl & Fuchs:KFA5-SR2-EX2.W or KFA6-SR2-EX2.W
Inductive Low Alarm circuits (terminals «+» and «-») – for connection of circuits Pepperl+Fuchs mod. SJ 3,5-SN type 2	10,6	19,1	51	30	100	Pepperl & Fuchs:KFA5-SR2-EX2.W or KFA6-SR2-EX2.W

Table 1-10 Process and Ambient Temperature Limits: Intrinsic Safety (ia) / Non-sparking (nA) / Enclosure Dust (tc)

Document # 834Z948

This specification covers the ambient and process temperature limits for 3809G models equipped with electronics - *Intrinsic Safety (ia/ic) / Non-sparking (nA)/ Enclosure dust (tc).*

Table 1-10-1: cULus Certification
Maximum allowable Process Temperature and Ambient Temperature Limits

		Maximum Process Temperature (°C)					
Meter Option		Without Digital Display			With or without Digital Display		
Temperature Class		T6	T6	T5	T4	T3	T2
Housing type	Ambient Temperature (°C)	Without Alarm Switch	With Alarm Switch	With or without Alarm Switch	With or without Alarm Switch	With or without Alarm Switch	With or without Alarm Switch
Aluminum	-40 to 40	85	85	100	126	N/A	N/A
	-40 to 45	85	85	100	115	N/A	N/A
	-40 to 50	85	85	100	104	N/A	N/A
	-40 to 55	85	84	94	94	N/A	N/A
	-40 to 60	84	76	84	84	N/A	N/A
	-40 to 65	76	69	76	76	N/A	N/A
	-40 to 70 ##	69	N/A	69	69	N/A	N/A
Stainless Steel	-40 to 40	85	85	100	135	200	N/A
	-40 to 45	85	85	100	135	194	N/A
	-40 to 50	85	85	100	135	167	N/A
	-40 to 55	85	85	100	135	138	N/A
	-40 to 60	85	85	100	110	110	N/A
	-40 to 65	85	69	86	86	86	N/A
	-40 to 70 ##	69	N/A	69	69	69	N/A
Stainless Steel High Temp	-40 to 40	85	85	100	135	200	267
	-40 to 45	85	85	100	135	200	221
	-40 to 50	85	85	100	135	182	182
	-40 to 55	85	85	100	135	149	149
	-40 to 60	85	85	100	119	119	119
	-40 to 65	85	69	91	91	91	91
	-40 to 70 ##	69	N/A	69	69	69	69

Maximum Ambient Temp for Transmitter = 70°C. Maximum Ambient Temperature for Inductive alarm = 66°C

Table 1-10-2: ATEX / IECEx Certification
Maximum allowable Process Temperature and Ambient Temperature Limits

		Maximum Process Temperature (°C)					
Meter Option		Without Digital Display			With or without Digital Display		
Temperature Class		T6	T6	T5	T4	T3	T2
Housing type	Ambient Temperature (°C)	Without Alarm Switch	With Alarm Switch	With or without Alarm Switch	With or without Alarm Switch	With or without Alarm Switch	With or without Alarm Switch
Aluminum	-40 to 35	85	85	100	135	N/A	N/A
	-40 to 40	85	85	100	126	N/A	N/A
	-40 to 45	85	85	100	115	N/A	N/A
	-40 to 50	85	85	100	104	N/A	N/A
	-40 to 55	85	84	94	94	N/A	N/A
	-40 to 60	84	76	84	84	N/A	N/A
	-40 to 65	76	69	76	76	N/A	N/A
	-40 to 70 ##	69	N/A	69	69	N/A	N/A
Stainless Steel	-40 to 40	85	85	100	135	200	N/A
	-40 to 45	85	85	100	135	194	N/A
	-40 to 50	85	85	100	135	167	N/A
	-40 to 55	85	85	100	135	138	N/A
	-40 to 60	85	85	100	110	110	N/A
	-40 to 65	85	69	86	86	86	N/A
	-40 to 70 ##	69	N/A	69	69	69	N/A
Stainless Steel High Temp	-40 to 35	85	85	100	135	200	300
	-40 to 40	85	85	100	135	200	267
	-40 to 45	85	85	100	135	200	221
	-40 to 50	85	85	100	135	182	182
	-40 to 55	85	85	100	135	149	149
	-40 to 60	85	85	100	119	119	119
	-40 to 65	85	69	91	91	91	91
	-40 to 70 ##	69	N/A	69	69	69	69

Maximum Ambient Temp for Transmitter = 70°C. Maximum Ambient Temperature for Inductive alarm = 66°C

Transmitter Description Table

Power Supply Transmitter	21 to 30 Vdc: (2-wire current loop transmitter) 4-20 mA analog output with HART data. Update rate: 4 times per sec. Range: 3.8 to 22.0 mA.
Two Alarm Outputs (open collector)	Optically isolated outputs assignable to alarms. • Max. off-state voltage: 30 Vdc • Max. off-state current: 0,05 mA • Max. on-state voltage: 1.2 Vdc • Max. on-state current: 20 mA
One Pulse Output (open collector)	Optically isolated. Scaleable to a variety of engineering unit systems (pulses per liter, gallons, etc.). • Range: 1 Hz to 1 kHz • Max. off-state voltage: 30 Vdc • Max. off-state current: 0.05 mA • Max. on-state voltage: 1.2 Vdc • Max. on-state current: 20 mA
Temperature Specification	See Temperature Cut-off Table on Page 1-5
Electrical Connector	M20 x 1,5 according to ISO (1/2" NPT, 3/4" NPT (F) or cable gland optional) • Brass/Nickel plated cable gland cable diameter range 8-11 mm • Stainless steel cable gland cable diameter range 7-10.5 mm
Linearity	Less than 1% at max. current.
Temperature Influence	Less than 0.04% per °C.
Voltage Influence	Less than 0.002% / Vdc.
Load Resistance Influence	± 0.1% full scale.

1-5-2 Inductive Alarms

Design Features

- 1 or 2 normally open inductive limit switches
- Optional intrinsically safe power supply/amplifier/relay unit
- For low or high limit signaling/switching
- Front adjustable

Relay Power Supply - recommended

Description

One or 2 electronic limit switches can be installed in the indicator housing to allow initiation of signaling or switching functions on a preset flow value. The limit switch operates as a slot initiator that is inductively actuated by a disc mounted on the pointer shaft. Any flow value can be used for setting the limit value by sliding the initiator along the indicator scale. Minimum setting distance between two limit switches is approximately 40% full scale. The position of the initiator also serves to visually indicate the set value. Settings can be adjusted by removing the indicator cover, loosening, moving and retightening of the alarm indication needle, and replacement of the indicator front cover.

Inductive Alarms Description Table

Power Supply	5 - 25 Vdc: (8 Vdc nominal)
Impedence	- Approximately 1 kohm with cam absent - Approximately 8 kohm with cam present
Ambient and Operating Temperature	See Temperature Cut-off Table on Page 1-5
Electrical Connector	M20 x 1,5 according to ISO (1/2" NPT, 3/4" NPT (F) or cable gland optional) • Brass/Nickel plated cable gland cable diameter range 8-11 mm • Stainless steel cable gland cable diameter range 7-10.5 mm

Alarm wiring diagrams
Refer to Figures 1-7 and 1-8.

Alarm accessories
Amplifier power supply (approved isolated barrier) 1 or 2 channel approved for intrinsically safe application, remotely mounted, 115 or 230 Vac power. Single pole with double throw (SPDT) relay standard.
For other configurations, consult factory.

Factory Default Alarm Signal
Measuring plate (also called cam) has been mounted according figure below. This means that the current consumption is defined as:
≥ 3 mA in case of measuring plate not detected = no alarm signal generated
≤1 mA in case of measuring plate detected = alarm signal generated
In combination with a NAMUR relay as mentioned above, the signal can be converted by Normally Closed or Normally Open connections.
In combination with PLC / DCS alike system, the mA signals should be obliged as above since June 2005.

1-5-3 Microprocessor Transmitter with or without Inductive Alarms

This combined system provides both the sophistication of the microprocessor along with the simplicity of one or two switch inductive alarms. Specifications for the transmitter are as stated previously and specifications for the front adjustable alarms are as described in the section Inductive Alarm Switches.

Wiring diagrams
Refer to Figures 1-4, 1-6 and 1-8

For Division 1 explosion proof installations, the optional explosion proof enclosure must be used. This enclosure does not use the auxiliary terminal box, as shown on some of the installation diagrams. All connections are made directly within the housing.
For Division 2 non-incendive installations, either the standard enclosure or the explosion proof enclosure may be used.
For both Division 1 explosion proof and Division 2 non-incendive installations, the barriers shown in the installation drawings are optional.
Wiring must be done in accordance with the applicable electrical codes, i.e., NEC Chapter 5 and CEC Section 18, Canadian Electrical Code and any local codes.

Transmitter accessories
General purpose and intrinsically safe HART compatible power supplies are available in 120V and 240V.

Specifications - Transmitters

Power Supply	22.8 to 30 Vdc: (2-wire current loop transmitter)
Transmitter	4-20 mA analog output with HART data. Update rate: 4 times per sec. Range: 3.8 to 22.0 mA.
Two Alarm Outputs (open collector)	Optically isolated outputs assignable to alarms. • Max. off-state voltage: 30 Vdc • Max. off-state current: 0,05 mA • Max. on-state voltage: 1.2 Vdc • Max. on-state current: 20 mA
One Pulse Output (open collector)	Optically isolated. Scaleable to a variety of engineering unit systems (pulses per liter, gallons, etc.). • Range: 1 Hz to 1 kHz • Max. off-state voltage: 30 Vdc • Max. off-state current: 0.05 mA • Max. on-state voltage: 1.2 Vdc • Max. on-state current: 20 mA
Temperature Specification	See Table 1-4
Electrical Connector	M20 x 1,5 according to ISO (1/2" NPT, 3/4" NPT (F) or cable gland optional) • Brass/Nickel plated cable gland cable diameter range 8-11 mm • Stainless steel cable gland cable diameter range 7-10.5 mm
Linearity	Less than 1% at max. current.
Temperature Influence	Less than 0.04% per °C.
Voltage Influence	Less than 0.002% / Vdc.
Load Resistance Influence	± 0.1% full scale.

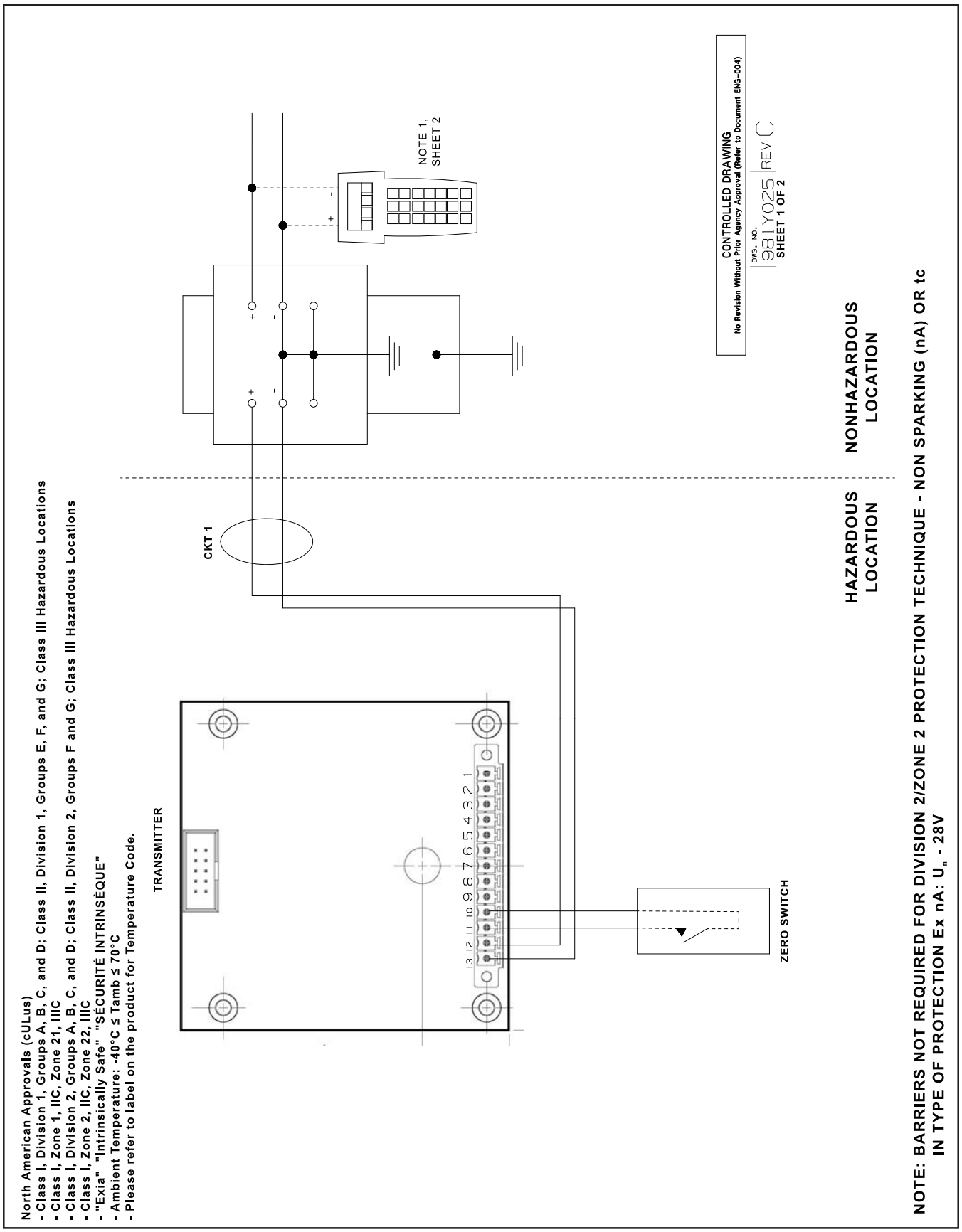

North American Approvals (cULus)
- Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III Hazardous Locations
- Class I, Zone 1, IIC, Zone 21, IIIC
- Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; Class III Hazardous Locations
- Class I, Zone 2, IIC, Zone 22, IIIC
- "Exia" "Intrinsically Safe" "SÉCURITÉ INTRINSÈQUE"
- Ambient Temperature: -40°C ≤ Tamb ≤ 70°C
- Please refer to label on the product for Temperature Code.
TRANSMITTER
13 12 11 10 9 8 7 6 5 4 3 2 1
CKT 1
NOTE 1, SHEET 2
ZERO SWITCH
HAZARDOUS LOCATION
NONHAZARDOUS LOCATION
CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-004)
DWG. NO. 981Y025 REV C
SHEET 1 OF 2
NOTE: BARRIERS NOT REQUIRED FOR DIVISION 2/ZONE 2 PROTECTION TECHNIQUE - NON SPARKING (nA) OR tc
IN TYPE OF PROTECTION Ex nA: U_n - 28V

Figure 1-4A Wiring Diagram, Model MT3809 Transmitter, 4-20 mA

1. This device is a Rosemount hand help communicator.
2. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY, AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SÉCURITÉ INTRINSÈQUE
3. WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS. AVERTISSMENT – RISQUE D'EXPLOSION. NE PAS DÉBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION À MOINS QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.
4. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS (AS APPLICABLE) OR NON-HAZARDOUS LOCATIONS ONLY. CET EQUIPEMENT CONVIENT POUR UTILISATION CLASSE I, DIVISION 2, GROUPES (TOUS) OU LOCATIONS NON-DANGEREUSES SEULEMENT.
5. WARNING – ENCLOSURE CONTAINS ALUMINUM. PRECAUTIONS MUST BE TAKEN TO AVOID IGNITION DUE TO IMPACT. AVERTISSEMENT- LE BOÎTIER CONTIENS DE L'ALUMINIUM. DES PRÉCAUTIONS S'APPLIQUENT POUR ÉVITER L'IGNITION PAR IMPACT.
6. WARNING – FROM A SAFETY POINT OF VIEW THE CIRCUITS SHALL BE ASSUMED TO BE CONNECTED TO EARTH AVERTISSEMENT: PAR SÉCURITÉ LES CIRCUITS DEVRAIENT ÊTRE RELIÉS À LA MISE À LA TERRE.
7. Note for cULus approvals units: For devices using cable gland at field installation the following cable gland shall be used - American IP67 cable gland for the aluminum housing and an American rated IP68 cable gland for the Stainless steel and high temperature housings.
8. Entity Parameters:
   In type of protection Ex ia IIC/IIIC or Ex ic IIC/IIIC, only for connection to a certified intrinsically safe circuit, with following maximum values.

	Ui,V	Ii, mA	Pi, mW	Ci, nF	Li, µH	Recommended Barrier #
Signal 4-20mA (J1 terminals 12+ and 13-)	28	75	525	2,2	0.365	Stahl Type : 9001/01-280-075-101
	Uo,V	Io, mA	Po, mW	Ci, nF	Li, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	~0	~0	ATEX/IECEx Certification
	Uo,V	Io, mA	Po, mW	Co, µF	Lo, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	0.083	44	UL Certification

   # Note: The Recommended barrier listed above is not part of this UL certification.
9. The intrinsically safe device does not provide 500 V isolation with respect to earth. Associated apparatus used must be galvanically isolated or dual channel shunt zener diode barriers with linear outputs used channel to channel.
10. Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui), Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the intrinsically safe equipment, as shown in Table 1.
11. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci, must be less than the marked capacitance, Ca (or Co), shown on any associated apparatus used. The same applies for inductance (Lcable, Li and La or Lo, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft., Lcable = 0.2 µH/ft.

TABLE 1:		Associated Apparatus
I.S. Equipment		
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
Pmax (or (Pi)	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

   If Po of the associated apparatus is not known, it may be calculated using the formula Po = (Voc * Isc)/4 = (Uo * Io)/4.
12. Associated apparatus must be installed in accordance with its manufacturer's control drawing and Article 504 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.
13. When required by the manufacturer's control drawing, the associated apparatus must be connected to a suitable ground electrode per the National Electrical Code (ANSI/NFPA 70), the Canadian Electrical Code, or other local installation codes, as applicable. The resistance of the ground path must be less than 1 ohm.
14. Where multiple circuits extend from the same piece of intrinsically safe equipment to associated apparatus, they must be installed in separate cables or in one cable having suitable insulation. Refer to Article 504.30(B) of the National Electrical Code (ANSI/NFPA 70) and Instrument Society of America Recommended Practice ISA RP12.6 for installing intrinsically safe equipment.
15. Associated apparatus must not be used in combination unless permitted by the associated apparatus certification.
16. Control equipment must not use or generate more than 250 V rms or dc with respect to earth.
17. Standards use for evaluation:
    US Standards: UL 913 - Ed 8, UL 60079-31 - Ed 2, UL 60079-15 - Ed 4, UL 60079-11 - Ed 6,
    UL 60079-0 - Ed 6, ISA 12.12.01
    Canadian Standards: CSA C22.2 NO. 157 - Ed 3, CSA C22.2 NO. 213-M1987 - Ed 1,
    CSA C22.2 NO. 60079-0:11 - Ed 2, CSA C22.2 NO. 60079-11:14 - Ed 2,
    CSA C22.2 NO. 60079-15:12 - Ed 1, CSA C22.2 NO. 60079-31:12 - Ed 1

CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-0004)
DWG. NO. 981Y025 REV C
SHEET 2 OF 2

Figure 1-4B Wiring Diagram, Model MT3809 Transmitter, 4-20 mA

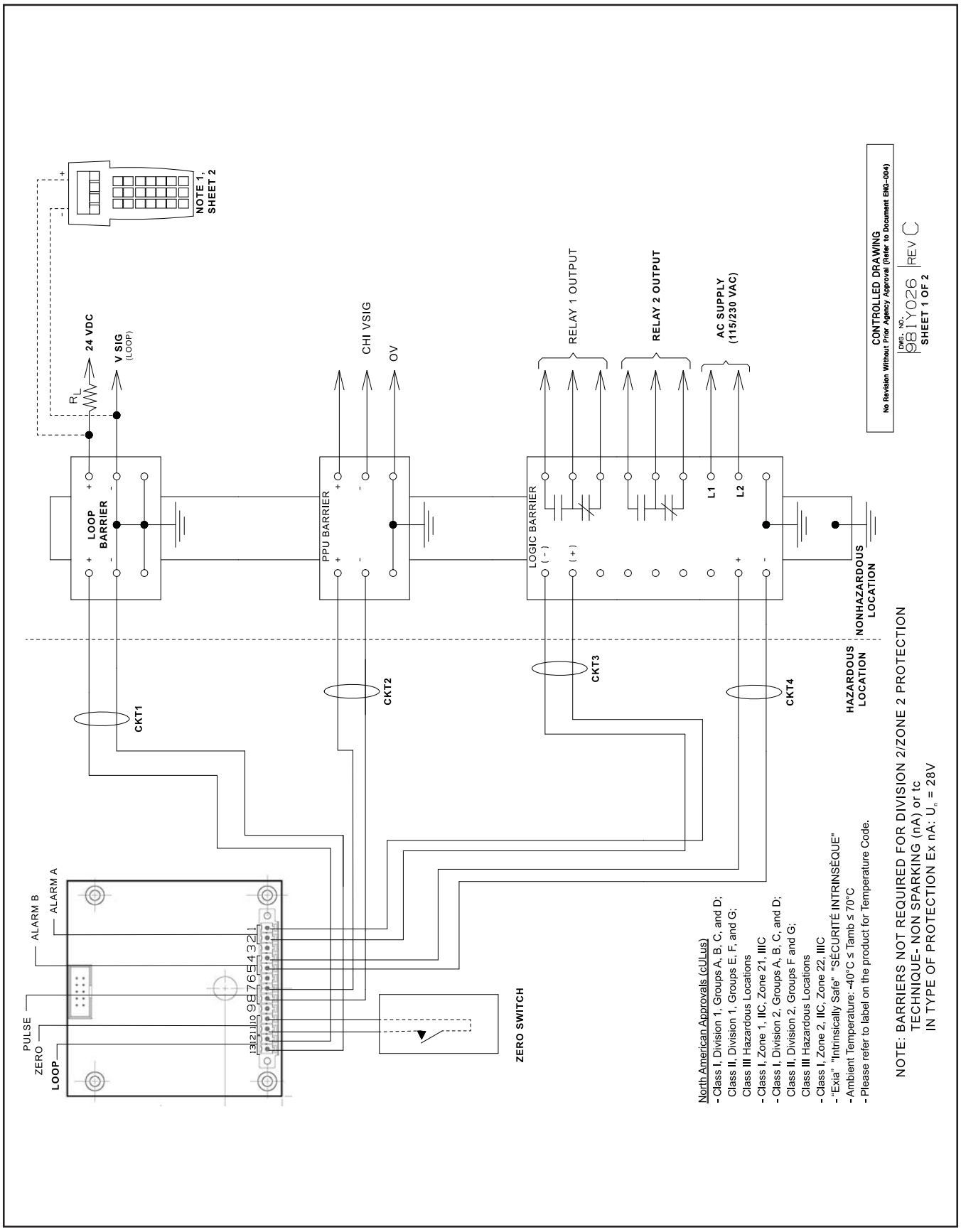

NOTE 1, SHEET 2
24 VDC
V SIG (LOOP)
R_L
LOOP BARRIER
PPU BARRIER
CHI VSIG
OV
LOGIC BARRIER
RELAY 1 OUTPUT
RELAY 2 OUTPUT
AC SUPPLY (115/230 VAC)
L1
L2
CKT1
CKT2
CKT3
CKT4
HAZARDOUS LOCATION
NONHAZARDOUS LOCATION
ALARM B
ALARM A
PULSE
ZERO
LOOP
ZERO SWITCH
CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-004)
DWG. NO. 981Y026 REV C
SHEET 1 OF 2
NOTE: BARRIERS NOT REQUIRED FOR DIVISION 2/ZONE 2 PROTECTION
TECHNIQUE- NON SPARKING (nA) or tc
IN TYPE OF PROTECTION Ex nA: U_n = 28V
North American Approvals (cULus)
- Class I, Division 1, Groups A, B, C, and D;
Class II, Division 1, Groups E, F, and G;
Class III Hazardous Locations
- Class I, Zone 1, IIC, Zone 21, IIIC
- Class I, Division 2, Groups A, B, C, and D;
Class II, Division 2, Groups F and G;
Class III Hazardous Locations
- Class I, Zone 2, IIC, Zone 22, IIIC
- "Exia" "Intrinsically Safe" "SÉCURITÉ INTRINSÈQUE"
- Ambient Temperature: -40°C ≤ Tamb ≤ 70°C
- Please refer to label on the product for Temperature Code.

Figure 1-5A Wiring Diagram, Model MT3809, 4-20 mA Transmitter, One or Two Optical Alarms and PPU

1. This device is a Rosemount hand help communicator.
2. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SÉCURITÉ INTRINSÈQUE
3. WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.
   AVERTISSMENT – RISQUE D'EXPLOSION. NE PAS DÉBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION À MOINS QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.
4. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS (AS APPLICABLE) OR NON-HAZARDOUS LOCATIONS ONLY. CET EQUIPEMENT CONVIENT POUR UTILISATION CLASSE I, DIVISION 2, GROUPES (TOUS) OU LOCATIONS NON-DANGEREUSES SEULEMENT.
5. WARNING – ENCLOSURE CONTAINS ALUMINUM. PRECAUTIONS MUST BE TAKEN TO AVOID IGNITION DUE TO IMPACT.
   AVERTISSEMENT- LE BOÎTIER CONTIENS DE L'ALUMINIUM. DES PRÉCAUTIONS S'APPLIQUENT POUR ÉVITER L'IGNITION PAR IMPACT.
6. WARNING – FROM A SAFETY POINT OF VIEW THE CIRCUITS SHALL BE ASSUMED TO BE CONNECTED TO EARTH
   AVERTISSEMENT: PAR SÉCURITÉ LES CIRCUITS DEVRAIENT ÊTRE RELIÉS À LA MISE À LA TERRE.
7. Note for cULus approvals units: For devices using cable gland at field installation the following cable gland shall be used - American IP67 cable gland for the aluminum housing and an American rated IP68 cable gland for the Stainless steel and high temperature housings.
8. Entity Parameters:
   In type of protection Ex ia **IIC/IIIC** or Ex ic **IIC/IIIC**, only for connection to a certified intrinsically safe circuit, with following maximum values.

	Ui,V	Ii, mA	Pi, mW	Ci, nF	Li, µH	Recommended Barrier #
Signal 4-20mA (J1 terminals 12+ and 13-)	28	75	525	2,2	0.365	Stahl Type : 9001/01-280-075-101
Pulse output (J1 terminals 7+ and 8-)	28	84	660	~0	~0	Stahl Type : 9002/77-280-094-001
Alarm circuits (J1 terminals 1+ and 2-)	10,6	19,1	51	~0	~0	Pepperl & Fuchs: KFA5-SR2-EX2.W or KFA6-SR2-EX2.W
	10,5	13	34	~0	~0	Pepperl & Fuchs: KFD2-SR2-EX2.W
Alarm circuits (J1 terminals 4+ and 5-)	10,6	19,1	51	~0	~0	Pepperl & Fuchs: KFA5-SR2-EX2.W or KFA6-SR2-EX2.W
	10,5	13	34	~0	~0	Pepperl & Fuchs: KFD2-SR2-EX2.W
	Uo,V	Io, mA	Po, mW	Ci, nF	Li, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	~0	~0	ATEX/IECEx Certification
	Uo,V	Io, mA	Po, mW	Co, µF	Lo, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	0.083	44	UL Certification

Note: The Recommended barriers listed above are not part of this UL certification.

9. The intrinsically safe device does not provide 500 V isolation with respect to earth. Associated apparatus used must be galvanically isolated or dual channel shunt zener diode barriers with linear outputs used channel to channel.
10. Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui), Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the intrinsically safe equipment, as shown in Table 1.
11. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci, must be less than the marked capacitance, Ca (or Co), shown on any associated apparatus used. The same applies for inductance (Lcable, Li and La or Lo, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft., Lcable = 0.2 µH/ft.

TABLE 1:

I.S. Equipment		Associated Apparatus
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
Pmax (or PI)	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

If Po of the associated apparatus is not known, it may be calculated using the formula Po = (Voc * Isc)/4 = (Uo * Io)/4.

12. Associated apparatus must be installed in accordance with its manufacturer's control drawing and Article 504 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.
13. When required by the manufacturer's control drawing, the associated apparatus must be connected to a suitable ground electrode per the National Electrical Code (ANSI/NFPA 70), the Canadian Electrical Code, or other local installation codes, as applicable. The resistance of the ground path must be less than 1 ohm.
14. Where multiple circuits extend from the same piece of intrinsically safe equipment to associated apparatus, they must be installed in separate cables or in one cable having suitable insulation. Refer to Article 504.30(B) of the National Electrical Code (ANSI/NFPA 70) and Instrument Society of America Recommended Practice ISA RP12.6 for installing intrinsically safe equipment.
15. Associated apparatus must not be used in combination unless permitted by the associated apparatus certification.
16. Control equipment must not use or generate more than 250 V rms or dc with respect to earth.
17. Standards use for evaluation:
    US Standards: UL 913 - Ed 8, UL 60079-31 - Ed 2, UL 60079-15 - Ed 4, UL 60079-11 - Ed 6, UL 60079-0 - Ed 6, ISA 12.12.01
    Canadian Standards: CSA C22.2 NO. 157 - Ed 3, CSA C22.2 NO. 213-M1987 - Ed 1, CSA C22.2NO. 60079-0:11 - Ed 2, CSA C22.2 NO. 60079-11:14 - Ed 2, CSA C22.2 NO. 60079-15:12 - Ed 1, CSA C22.2 NO. 60079-31:12 - Ed 1

CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-004)
DWG. NO. 9B1Y026 REV C
SHEET 2 OF 2

Figure 1-5B Wiring Diagram, Model MT3809, 4-20 mA Transmitter, One or Two Optical Alarms and PPU

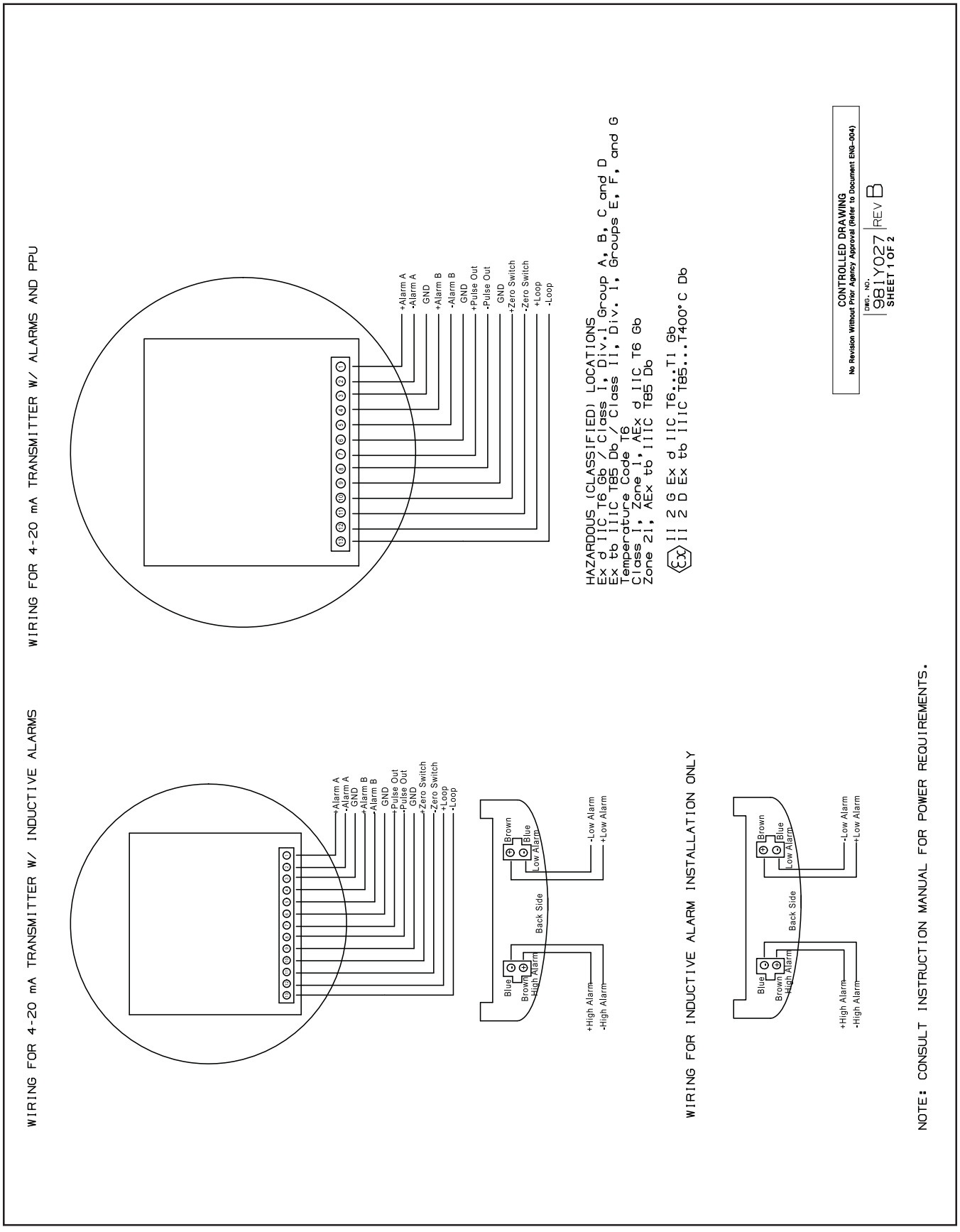


Figure 1-6A Wiring Diagram, Model MT3809 Explosion Proof, 4-20 mA Transmitter with Inductive Alarms, Optical Alarms and PPU

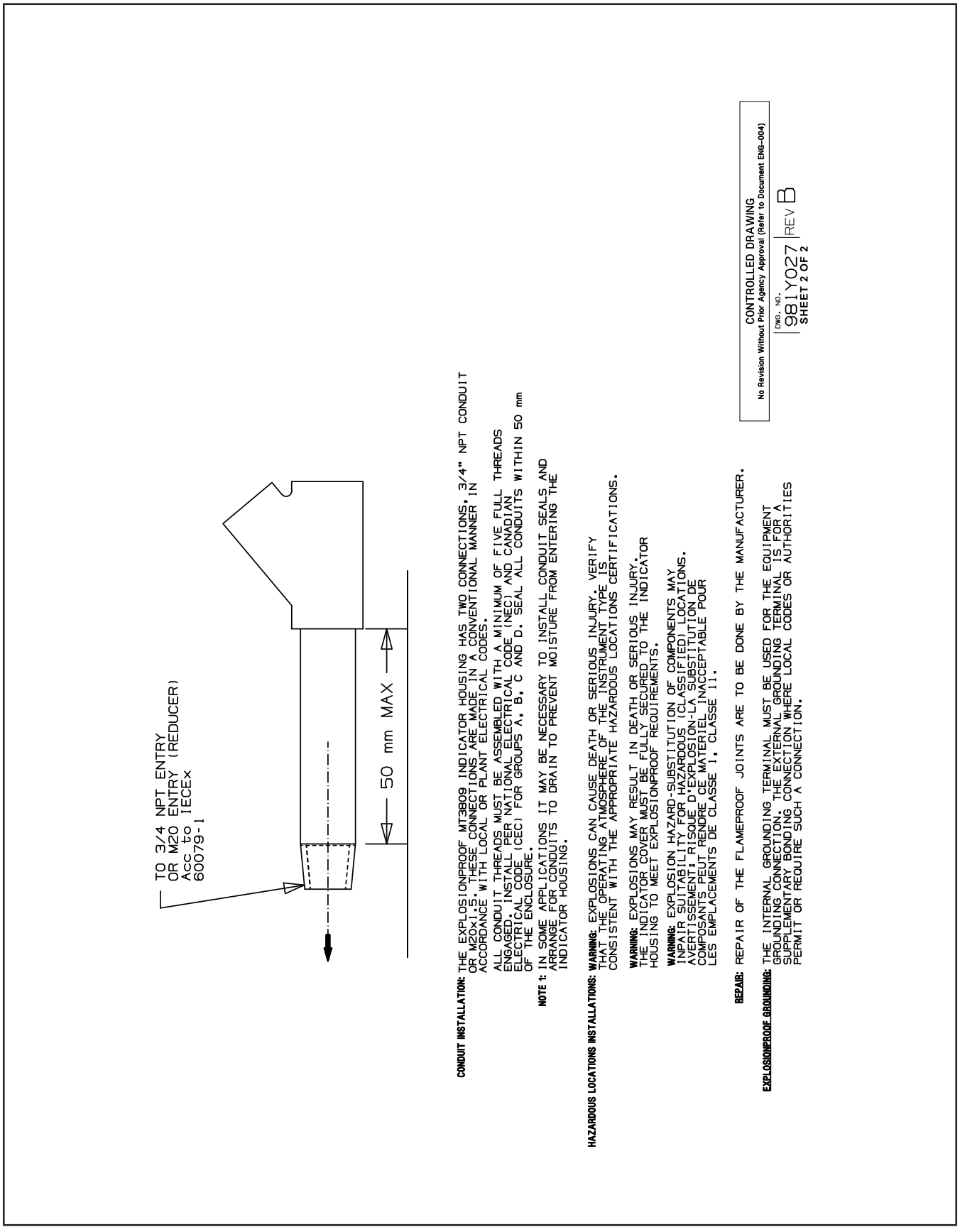

TO 3/4 NPT ENTRY
OR M20 ENTRY (REDUCER)
Acc to
IECEx
60079-1
50 mm MAX
CONDUIT INSTALLATION: THE EXPLOSIONPROOF MT3809 INDICATOR HOUSING HAS TWO CONNECTIONS, 3/4" NPT CONDUIT OR M20x1.5. THESE CONNECTIONS ARE MADE IN A CONVENTIONAL MANNER IN ACCORDANCE WITH LOCAL OR PLANT ELECTRICAL CODES.
ALL CONDUIT THREADS MUST BE ASSEMBLED WITH A MINIMUM OF FIVE FULL THREADS ENGAGED. INSTALL PER NATIONAL ELECTRICAL CODE (NEC) AND CANADIAN ELECTRICAL CODE (CEC) FOR GROUPS A, B, C AND D. SEAL ALL CONDUITS WITHIN 50 mm OF THE ENCLOSURE.
NOTE 1: IN SOME APPLICATIONS IT MAY BE NECESSARY TO INSTALL CONDUIT SEALS AND ARRANGE FOR CONDUITS TO DRAIN TO PREVENT MOISTURE FROM ENTERING THE INDICATOR HOUSING.
HAZARDOUS LOCATIONS INSTALLATIONS: WARNING: EXPLOSIONS CAN CAUSE DEATH OR SERIOUS INJURY. VERIFY THAT THE OPERATING ATMOSPHERE OF THE INSTRUMENT TYPE IS CONSISTENT WITH THE APPROPRIATE HAZARDOUS LOCATIONS CERTIFICATIONS.
WARNING: EXPLOSIONS MAY RESULT IN DEATH OR SERIOUS INJURY. THE INDICATOR COVER MUST BE FULLY SECURED TO THE INDICATOR HOUSING TO MEET EXPLOSIONPROOF REQUIREMENTS.
WARNING: EXPLOSION HAZARD-SUBSTITUTION OF COMPONENTS MAY INPAIR SUITABILITY FOR HAZARDOUS (CLASSIFIED) LOCATIONS. AVERTISSEMENT: RISQUE D'EXPLOSION-LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE 1, CLASSE 11.
REPAIR: REPAIR OF THE FLAMEPROOF JOINTS ARE TO BE DONE BY THE MANUFACTURER.
EXPLOSIONPROOF GROUNDING: THE INTERNAL GROUNDING TERMINAL MUST BE USED FOR THE EQUIPMENT GROUNDING CONNECTION. THE EXTERNAL GROUNDING TERMINAL IS FOR A SUPPLEMENTARY BONDING CONNECTION WHERE LOCAL CODES OR AUTHORITIES PERMIT OR REQUIRE SUCH A CONNECTION.
CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-004)
DWG. NO. 981Y027 REV B
SHEET 2 OF 2

Figure 1-6B Wiring Diagram, Model MT3809 Explosion Proof, 4-20 mA Transmitter with Inductive Alarms, Optical Alarms and PPU

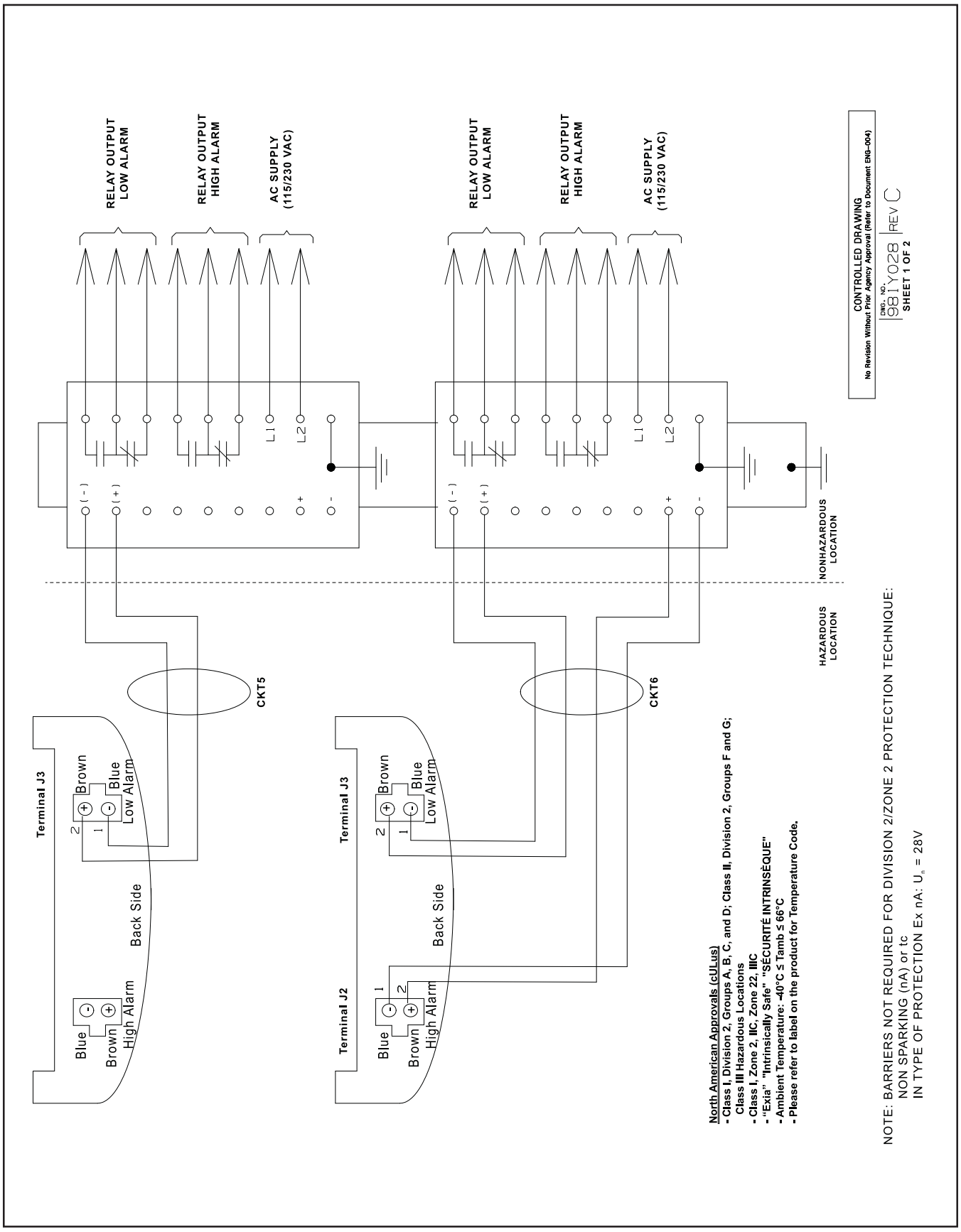

RELAY OUTPUT LOW ALARM
RELAY OUTPUT HIGH ALARM
AC SUPPLY (115/230 VAC)
RELAY OUTPUT LOW ALARM
RELAY OUTPUT HIGH ALARM
AC SUPPLY (115/230 VAC)
CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-004)
DWG. NO. 981Y028 REV C
SHEET 1 OF 2
NONHAZARDOUS LOCATION
HAZARDOUS LOCATION
CKT5
CKT6
Terminal J3
Terminal J2
Brown
Blue
Low Alarm
High Alarm
Back Side
North American Approvals (cULus)
- Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; Class III Hazardous Locations
- Class I, Zone 2, IIC, Zone 22, IIIC
- "Exia" "Intrinsically Safe" "SÉCURITÉ INTRINSÈQUE"
- Ambient Temperature: -40°C ≤ Tamb ≤ 66°C
- Please refer to label on the product for Temperature Code.
NOTE: BARRIERS NOT REQUIRED FOR DIVISION 2/ZONE 2 PROTECTION TECHNIQUE:
NON SPARKING (nA) or tc
IN TYPE OF PROTECTION Ex nA: U_o = 28V

Figure 1-7A Wiring Diagram, Model MT3809, One or Two Inductive Alarms

1. This device is a Rosemount hand help communicator.
2. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SÉCURITÉ INTRINSÈQUE
3. WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.
   AVERTISSMENT – RISQUE D'EXPLOSION. NE PAS DÉBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION À MOINS QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.
4. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS (AS APPLICABLE) OR NON-HAZARDOUS LOCATIONS ONLY.
   CET EQUIPEMENT CONVIENT POUR UTILISATION CLASSE I, DIVISION 2, GROUPES (TOUS) OU LOCATIONS NON-DANGEREUSES SEULEMENT.
5. WARNING – ENCLOSURE CONTAINS ALUMINUM. PRECAUTIONS MUST BE TAKEN TO AVOID IGNITION DUE TO IMPACT.
   AVERTISSEMENT- LE BOÎTIER CONTIENS DE L'ALUMINIUM. DES PRÉCAUTIONS S'APPLIQUENT POUR ÉVITER L'IGNITION PAR IMPACT.
6. WARNING – FROM A SAFETY POINT OF VIEW THE CIRCUITS SHALL BE ASSUMED TO BE CONNECTED TO EARTH
   AVERTISSEMENT: PAR SÉCURITÉ LES CIRCUITS DEVRAIENT ÊTRE RELIÉS À LA MISE À LA TERRE.
7. Note for cULus approvals units: For devices using cable gland at field installation the following cable gland shall be used - American IP67 cable gland for the aluminum housing and an American rated IP68 cable gland for the Stainless steel and high temperature housings.
8. Standards use for evaluation:
   US Standards: UL 60079-31 - Ed 2, UL 60079-15 - Ed 4, UL 60079-0 - Ed 6, ISA 12.12.01
   Canadian Standards: CSA C22.2 NO. 213-M1987 - Ed 1, CSA C22.2 NO. 60079-0:11 - Ed 2,
   CSA C22.2 NO. 60079-15:12 - Ed 1, CSA C22.2 NO. 60079-31:12 - Ed 1

   Notes 9 through 12 are not applicable for cULus certification

9. Entity Parameters:
   In type of protection Ex ia IIC/IIIC or Ex ic IIC/IIIC, only for connection to a certified intrinsically safe circuit, with following maximum values.

	Ui,V	Ii, mA	Pi, mW	Ci, nF	Li, µH	Recommended Barrier #
Inductive High Alarm circuits (terminals «+» and «-») – for connection of circuits Pepperl+Fuchs mod. SJ 3.5-SN type 2	10,6	19,1	51	30	100	Pepperl & Fuchs: KFA5-SR2-EX2.W or KFA6-SR2-EX2.W
Inductive Low Alarm circuits (terminals «+» and «-») – for connection of circuits Pepperl+Fuchs mod. SJ 3.5-SN type 2	10,6	19,1	51	30	100	Pepperl & Fuchs: KFA5-SR2-EX2.W or KFA6-SR2-EX2.W

10. The intrinsically safe device does not provide 500 V isolation with respect to earth. Associated apparatus used must be galvanically isolated or dual channel shunt zener diode barriers with linear outputs used channel to channel.
11. Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui), Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the intrinsically safe equipment, as shown in Table 1.
12. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1.
    Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci, must be less than the marked capacitance, Ca (or Co), shown on any associated apparatus used.
    The same applies for inductance (Lcable, Li and La or Lo, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft., Lcable = 0.2 µH/ft.

TABLE 1:		
I.S. Equipment		Associated Apparatus
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
Pmax (or Pi)	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

If Po of the associated apparatus is not known, it may be calculated using the formula Po = (Voc * Isc)/4 = (Uo * Io)/4.

CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-0004)
DWG. NO. 981Y028 REV C
SHEET 2 OF 2

Figure 1-7B Wiring Diagram, Model MT3809, One or Two Inductive Alarms

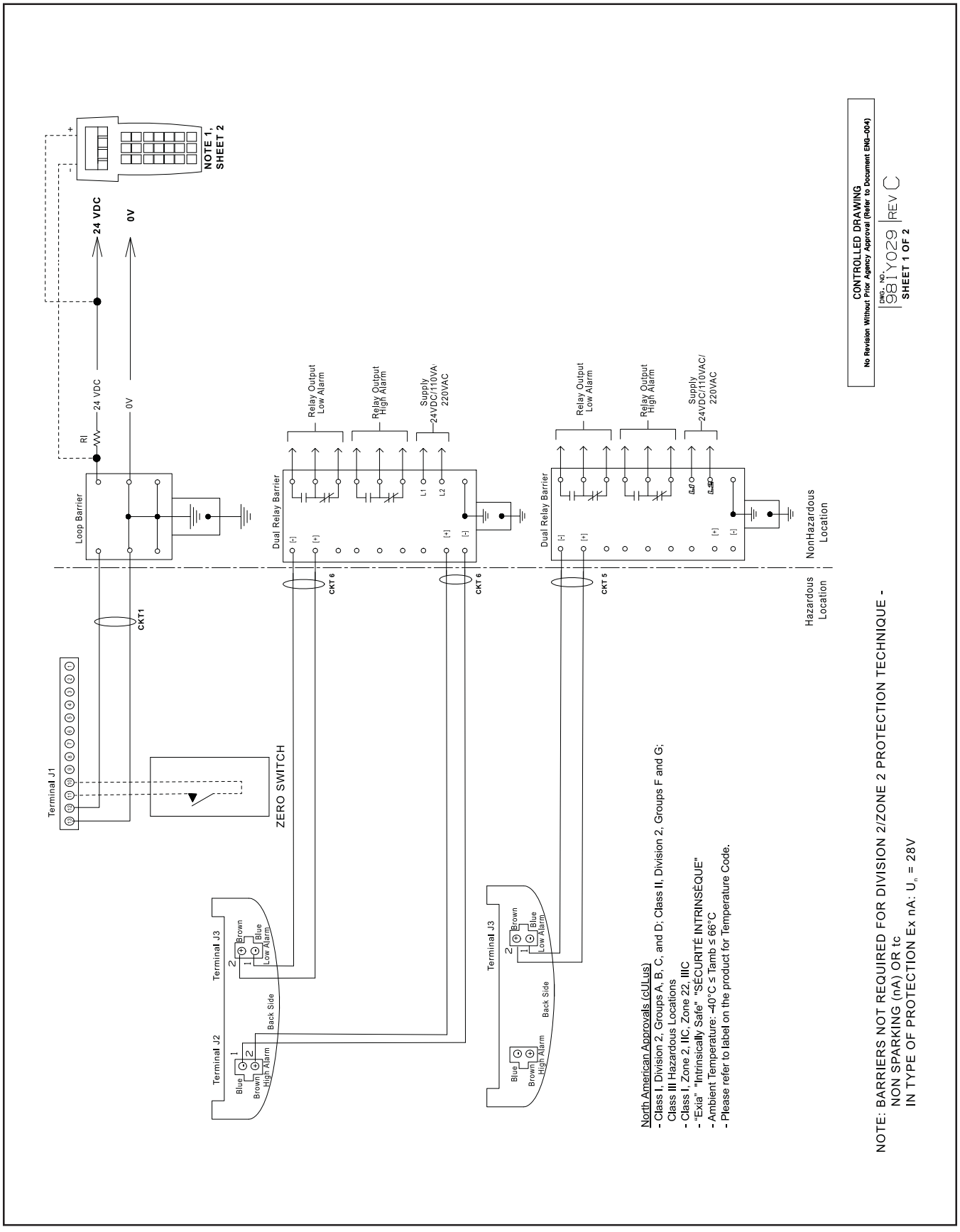

CONTROLLED DRAWING
No Revision Without Prior Agency Approval (Refer to Document ENG-004)
DWG. NO. 981Y029 REV C
SHEET 1 OF 2
NOTE 1, SHEET 2
24 VDC
0V
RI
Loop Barrier
Dual Relay Barrier
Relay Output Low Alarm
Relay Output High Alarm
Supply 24VDC/110VAC/ 220VAC
CKT1
CKT 6
CKT 5
Hazardous Location
NonHazardous Location
Terminal J1
ZERO SWITCH
Terminal J3
Terminal J2
Brown
Blue
Low Alarm
High Alarm
Back Side
North American Approvals (cULus)
- Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G;
Class III Hazardous Locations
- Class I, Zone 2, IIC, Zone 22, IIIC
- "Exia" "Intrinsically Safe" "SÉCURITÉ INTRINSÈQUE"
- Ambient Temperature: -40°C ≤ Tamb ≤ 66°C
- Please refer to label on the product for Temperature Code.
NOTE: BARRIERS NOT REQUIRED FOR DIVISION 2/ZONE 2 PROTECTION TECHNIQUE -
NON SPARKING (nA) OR tc
IN TYPE OF PROTECTION Ex nA: U_n = 28V

Figure 1-8A Wiring Diagram, Model MT3809, 4-20 mA Transmitter, One or Two Inductive Alarms

1. This device is a Rosemount hand help communicator.
2. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SÉCURITÉ INTRINSÈQUE
3. WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.
   AVERTISSMENT – RISQUE D'EXPLOSION. NE PAS DÉBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION À MOINS QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.
4. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS (AS APPLICABLE) OR NON-HAZARDOUS LOCATIONS ONLY.
   CET EQUIPEMENT CONVIENT POUR UTILISATION CLASSE I, DIVISION 2, GROUPES (TOUS) OU LOCATIONS NON-DANGEREUSES SEULEMENT.
5. WARNING – ENCLOSURE CONTAINS ALUMINUM. PRECAUTIONS MUST BE TAKEN TO AVOID IGNITION DUE TO IMPACT.
   AVERTISSEMENT- LE BOÎTIER CONTIENS DE L'ALUMINIUM. DES PRÉCAUTIONS S'APPLIQUENT POUR ÉVITER L'IGNITION PAR IMPACT.
6. WARNING – FROM A SAFETY POINT OF VIEW THE CIRCUITS SHALL BE ASSUMED TO BE CONNECTED TO EARTH
   AVERTISSEMENT: PAR SÉCURITÉ LES CIRCUITS DEVRAIENT ÊTRE RELIÉS À LA MISE À LA TERRE.
7. Note for cULus approvals units: For devices using cable gland at field installation the following cable gland shall be used - American IP67 cable gland for the aluminum housing and an American rated IP68 cable gland for the Stainless steel and high temperature housings.
8. Standards use for evaluation:
   US Standards: UL 60079-31 - Ed 2, UL 60079-15 - Ed 4, UL 60079-0 - Ed 6, ISA 12.12.01
   Canadian Standards: CSA C22.2 NO. 213-M1987 - Ed 1, CSA C22.2 NO. 60079-0:11 - Ed 2,
   CSA C22.2 NO. 60079-15:12 - Ed 1, CSA C22.2 NO. 60079-31:12 - Ed 1

   Notes 9 through 12 are not applicable for cULus certification

9. Entity Parameters:
   In type of protection Ex ia IIC/IIIC or Ex ic IIC/IIIC, only for connection to a certified intrinsically safe circuit, with following maximum values.

	Ui,V	Ii, mA	Pi, mW	Ci, nF	Li, µH	Recommended Barrier #
Signal 4-20mA (J1 terminals 12+ and 13-)	28	75	525	2,2	0.365	Stahl Type : 9001/01-280-075-101
Inductive High Alarm circuits (terminals «+» and «-») – for connection of circuits Pepperl+Fuchs mod. SJ 3,5-SN type 2	10,6	19,1	51	30	100	Pepperl & Fuchs: KFA5-SR2-EX2.W or KFA6-SR2-EX2.W
Inductive Low Alarm circuits (terminals «+» and «-») – for connection of circuits Pepperl+Fuchs mod. SJ 3,5-SN type 2	10,6	19,1	51	30	100	Pepperl & Fuchs: KFA5-SR2-EX2.W or KFA6-SR2-EX2.W
	Uo,V	Io, mA	Po, mW	Ci, nF	Li, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	¯0	¯0	ATEX/IECEx Certification
	Uo,V	Io, mA	Po, mW	Co, µF	Lo, mH	Notes
Remote zero loop signal (J1 terminals 10+ and 11-)	28	2,83	80	0.083	44	

10. The intrinsically safe device does not provide 500 V isolation with respect to earth. Associated apparatus used must be galvanically isolated or dual channel shunt zener diode barriers with linear outputs used channel to channel.
11. Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui), Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the intrinsically safe equipment, as shown in Table 1.
12. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1.
    Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci, must be less than the marked capacitance, Ca (or Co), shown on any associated apparatus used. The same applies for inductance (Lcable, Li and La or Lo, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft., Lcable = 0.2 µH/ft.

TABLE 1:

I.S. Equipment		Associated Apparatus
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
Pmax (or Pi)	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

If Po of the associated apparatus is not known, it may be calculated using the formula Po = (Voc * Isc)/4 = (Uo * Io)/4.

CONTROLLED DRAWING
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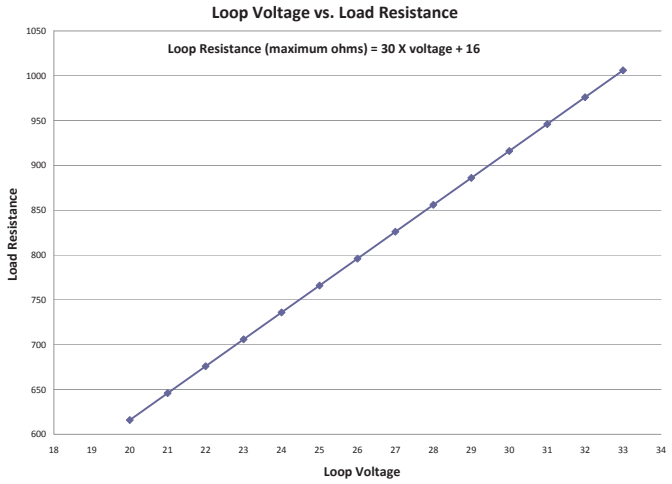
DWG. NO. 9B1Y029 REV C

SHEET 2 OF 2

Figure 1-8B Wiring Diagram, Model MT3809, 4-20 mA Transmitter, One or Two Inductive Alarms



Note: load resistance should also include I.S. barrier resistance. When using HART communicator the minimum load resistance is 250 ohms.

Figure 1-9A Power Supply vs. Maximum Load Resistance

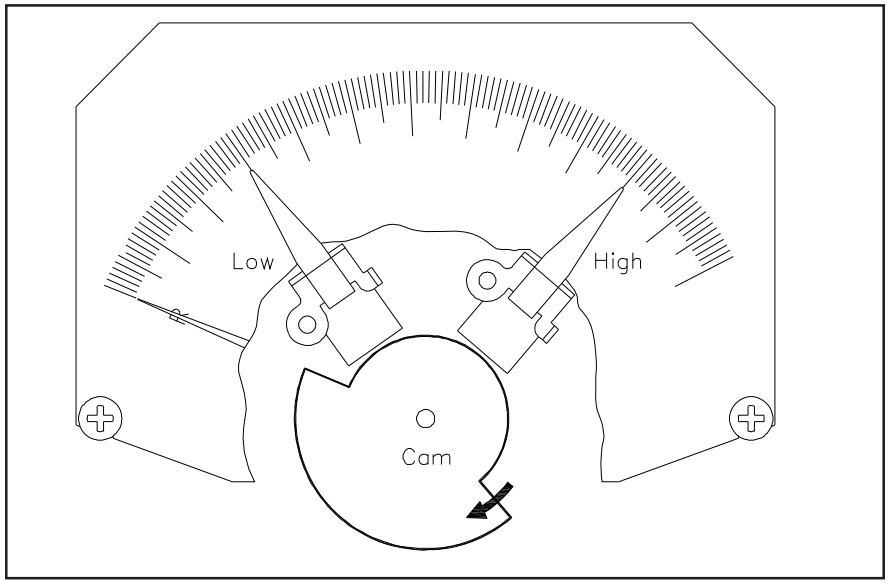


Figure 1-9B Cam Setting for Alarm Signal

2-1 General

This section contains the procedures for the receipt and installation of the instrument. Do not attempt to start the system until the instrument has been permanently installed. It is extremely important that the start-up procedures be followed in the exact sequence presented.

2-2 Receipt of Equipment

When the equipment is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to your nearest Product Service Department.

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554-FLOW (3569)
Tel (215) 362-3700
Fax (215) 362-3745
E-mail: BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, Netherlands
P.O. Box 428
710 BK Ede, Netherlands
Tel 31-318-549-300
Fax 31-318-549-309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7100
Fax 011-81-3-5633-7101
E-mail:BrooksAs@BrooksInstrument.com

Remove the envelope containing the packing list. Carefully remove the instrument from the packing case. Make sure spare parts are not discarded with the packing materials. Inspect for damaged or missing parts.

2-3 Recommended Storage Practices

If intermediate or long-term storage is required for equipment, as supplied by Brooks Instrument, it is recommended that the equipment be stored in accordance with the following:

a. Within the original shipping container.
b. Stored in a sheltered area, preferably a warm, dry, heated warehouse.
c. Ambient temperature of 21°C (70°F) nominal, 43°C (110°F) maximum, 7°C (45°F) minimum.
d. Relative humidity 45% nominal, 60% maximum, 25% minimum.

Upon removal from storage, a visual inspection should be conducted to verify the condition of equipment is "as received".

2-4 Return Shipment

Prior to returning any instrument to the factory visit the Brooks website www.BrooksInstrument.com for a Return Materials Authorization Number (RMA#), or contact one of the following locations:

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554-FLOW (3569)
Tel (215) 362-3700
Fax (215) 362-3745
E-mail: BrooksAm@BrooksInstrument.com
www.BrooksInstrument.com

Brooks Instrument
Neonstraat 3
6718 WX Ede, The Netherlands
P.O. Box 428
6710 BK Ede, Netherlands
Tel 31-318-549-300
Fax 31-318-549-309
E-mail: BrooksEu@BrooksInstrument.com

Brooks Instrument
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7100
Fax 011-81-3-5633-7101
E-mail:BrooksAs@BrooksInstrument.com

Instrument must have been purged in accordance with the following:

⚠ WARNING

Before returning the device purge thoroughly with a dry inert gas such as Nitrogen before disconnecting gas connections. Failure to correctly purge the instrument could result in fire, explosion or death. Corrosion or contamination may occur upon exposure to air.

All flow instruments returned to Brooks requires completion of Form RPR003-1, Brooks Instrument Decontamination Statement, along with a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. Failure to provide this information will delay processing by Brooks personnel. Copies of these forms can be downloaded from the Brooks website www.BrooksInstrument.com or are available from any Brooks Instrument location listed above.

2-5 Installation of Flowmeter

⚠ WARNING

If the inlet and outlet valves adjacent to the indicator are to be closed for any reason, the indicator must be completely drained. Failure to do so may result in thermal expansion of the liquid which can rupture the meter and cause possible personal injury.

⚠CAUTION

Meters weighing more than 40 pounds/18 kilograms are labeled and should be handled with care to prevent personal injury. The product can be lifted by the meter flange or meter pipe. The caution label is shown below.

⚠WARNING

The meter is capable of process fluids to 750°F/400°C with specific options. It is recommended that user install label(s) indicating hot surfaces.

Recommended installation for Models MT3809 and MT3810 is as follows:

a. Carefully remove the covers from each end of the flowmeter. The float may be fixed to avoid damage during transport. These plugs must be removed before use.

b. Install the flowmeter with the inlet at the bottom and the outlet at the top.

c. When installing the flowmeter in the process line, follow accepted plumbing practices for flanged meters (see Section 2-5-1 for lined meters).

d. Install the flowmeter within 5° of true vertical. Use of a level is recommended to determine the proper alignment.

e. When the process temperature is 300°C / 572°F or above insulation is required on the meter body and flanges. The insulation is installed between the indicator housing and the body and flanges. Do not wrap the indicator with insulation. Recommended insulation materials are calcium silicate, cellular glass or mineral wool with a thermal conductivity of .083 W/m-K at 300°C/572°F.

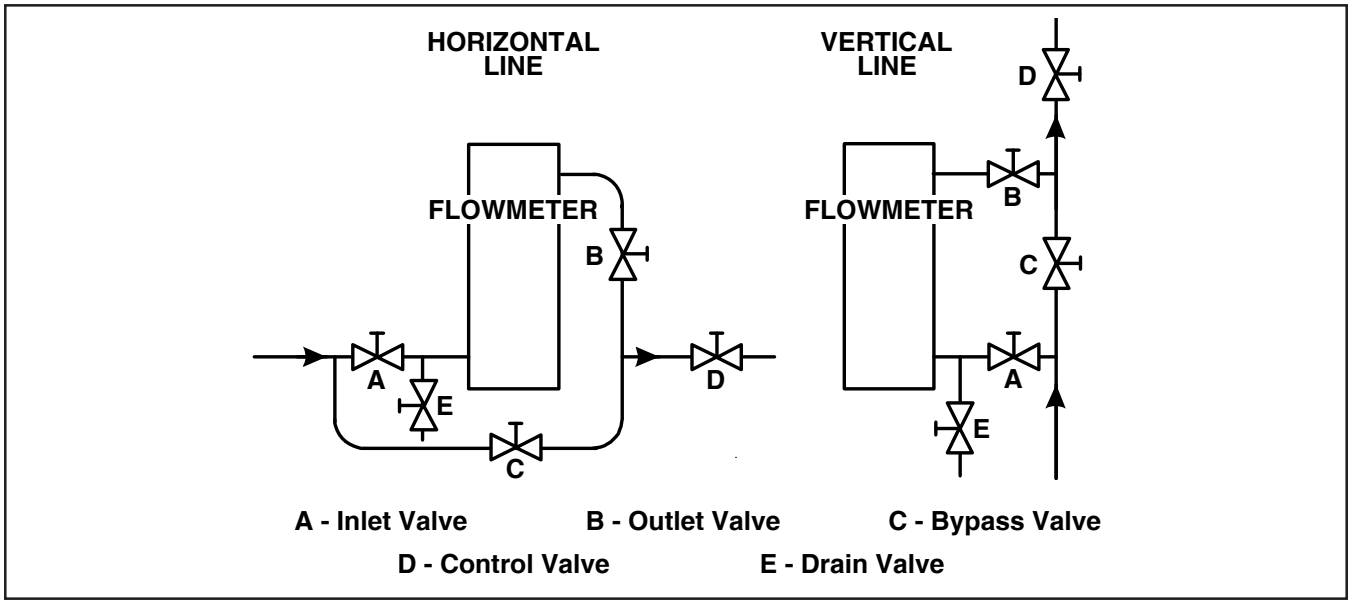


Figure 2-1 Typical Bypass Installation

2-5-1 Installation and Maximum Torques of Model MT3809 ETFE

MAXIMUM TORQUES MODEL MT3809 ETFE
Please refer to Table 2-1 below.

- Select **bolts and gaskets** (customer supply) in keeping with the flange pressure rating or the operating pressure. Also note corrosion resistance and thermal stability.
  Important: the inside diameter of the flanges deviates from the standard dimensions.
  Enlarge the flange gaskets to the appropriate size.
- **Align gaskets**, tighten nuts using the torques specified for the relevant pressure ratings.
- **Measuring section with E/TFE line with PTFE sealing face**
  PTFE is deformable under pressure in the cold state.
- Tighten the flange bolts nuts only with the following maximum torques:
- Advised bolting acc. ASTM A307 Grade B)

Table 2-1 Maximum Torques Model MT3809 ETFE

Nominal size to		**Bolts**		**Max. torque**	
ANSI B 16.5		**ANSI**		**ANSI 150 lbs**	
inches	lbs	150 lbs	300 lbs	Nm	ft. lbs
1/2"	150/300	4 x 1/2"	4 x 1/2"	3.5	2.5
1"	150/300	4 x 1/2"	4 x 5/8"	6.7	4.8
2"	150/300	4 x 5/8"	8 x 5/8"	24.0	17.4

2-6 Installation of the Model MT3809 Flowmeter with a Transmitter with or without Optional Alarms and Pulse Output.

a. Install the meter as described in Section 2.5
b. Transmitter setup is done solely through proper system wiring and parameter configuration. Common transmitter parameters are set by Brooks prior to shipment. These parameters, such as flow rate, are set based on order information, meter configuration or defaults inherent to the transmitter. If requested when ordering the electronics, all parameters will be set prior to receiving the unit and no further configuration will be needed at installation. However, more detailed configurations as well as on-line monitoring can be done through standard HART communication protocol, or can be set using a hand-held HART® communicator. See Operations Section 3 for manual programming details.

With a HART protocol compatible transmitter, the digital communication signals are superimposed on top of the 4-20 mA signal. Communication of more than just the process variables is possible.

The float is constructed with an integral magnet that activates a magnetic sensor that is part of the transmitter. This same float magnet also drives the mechanical pointer. The flow rate is scaleable by setting independent high and low range parameters. The analog output (AO) transmitter parameters, AO Hi-Range and AO Lo-Range span the 4-20 mA signal. For example, if flow rate is normally between 100 and 500 gpm, the AO Hi-

Range parameter is set at 500 and the AO Lo-Range is set at 100. Like other common parameters, the AO Hi-Range and AO Lo-Range can be set by Brooks prior to shipment.

c. Microprocessor transmitter wiring connections. Refer to Figures 1-4, 1-5 and 1-8.

⚠ CAUTION

Since this is a magnetically activated device, strong magnetic fields and materials with magnetic properties may cause faulty operation when in close proximity to the flowmeter. This includes steel pipes, steel conduit, motors and transformers.

⚠ CAUTION

Flowmeters with a transmitter must be mounted at least 0.5 meters (18 inches) apart to prevent the interaction of adjacent float magnets and transmitter.

⚠ WARNING

To prevent ignition of hazardous atmospheres and serious personal injury, proper installation methods must be used as defined in Article 505 of the National Electrical Code, and the Canadian Electrical Code and ISA Standard 12.6 and in accordance with Cenelec regulations.

Typically applications require only the use of the 2 wire loop analog signal. In some applications where transmitters and actuators are widely separated (e.g. tank farms), devices are wired in a multi-drop configuration to save wiring costs. Each unit is given an individual HART address in the range of 1-15 to distinguish each unit during communications over a common wire pair. In this configuration, the 4-20 mA output signal cannot be used.

To install the typical transmitter analog output configuration:

1. For intrinsically safe installation, intrinsic safety barrier selection, cable parameters, and power supply limits must be in accordance with the entity parameters shown in Figure 1-4. Alternatively, the optional intrinsically safe power supply available from Brooks may be used. Cable parameters for inductance and capacitance still apply.
Note: To ensure full EMC protection the ferrite core included with the meter must be installed to the input power I/O cable at the supply end of cable.
2. If the area classification is Division 2, a barrier is not required and cable parameters are not applicable. The electrical code will require the use of conduit for wire protection. Refer to Figure 1-4.
3. For flameproof installation, the optional explosion proof enclosure is required and explosion proof installation methods must be followed. Refer to Figure 1-6.
4. The shielded cable must be used for hook-up. The shield should be connected to chassis ground at the transmitter end and should be taped up and not connected at the receiver end. Insulation of the shield at the receiving end is especially important for intrinsically safe installations.
5. The maximum resistance of the loop resistor, the associated cable and the barrier is determined by the power supply voltage and is shown graphically in Figure 1-9.

6. After installation and powering of the loop, the transmitter must be zeroed, both electrically and mechanically. This operation will compensate for any stray magnetic effects in the vicinity of the transmitter. Flow must be verified to be zero when the zero function is momentarily activated.

Note: The zero adjusting of the pointer influences the transmitter indication, but not the other way around. Therefore, first adjust the pointer at the zero flow position, then the transmitter must be zeroed.

With the float at the zero flow position and the pointer at the zero position, set zero flow by either shorting the two pins together at the terminal block. If desired, a zero switch can be remotely mounted and wired to these terminals. The hazardous area classification will determine the wiring methods used for this switch.

The pointer must also be adjusted to the reference line on the scale using the adjustment screw on the face of the pointer, next to the hub. The zero function may be activated as part of a periodical maintenance check.

7. Under actual flow conditions, verify that the transmitter output matches the mechanical pointer position. If a discrepancy is noted, the HART communications channel can be used to verify or adjust the transmitter settings.

d. Microprocessor transmitter with alarm and pulse output wiring connections

All internal parameters can be accessed over the HART communications channel, including the configuration of the output signals used for alarms and pulse output. An external termination box is attached for easy hook-up of these signals. The alarms are configurable as normally open or normally closed.

The alarm contact and pulse output digital signals are electrically identical, independent, optically coupled transistor outputs. Wiring will be as required by the external driven system - Prover, DCS/PLC, terminal-automation system, batch controller etc. These can be wired as an open collector or open emitter signal on the high or low side of voltage-rail within the receiving equipment, depending upon the signal needs. When interfacing to external electronics, be careful to work within the voltage/current polarity and limits as specified in Section 1.
To install the typical transmitter alarms and/or pulse digital outputs configuration:
1. Intrinsically safe installations require the use of barriers, power supply limits and cable parameters as shown in the installation diagram. All connections are made in the transmitter housing. Refer to Figures 1-4 and 1-8.
Note: To ensure full EMC protection the ferrite core included with the meter must be installed to the input power I/O cable at the supply end of cable.
2. If the area classification is Division 2, barriers are not required and cable parameters are not applicable. However, the electrical code will require the use of conduit for wire protection. Refer to Figures 1-4 and 1-8.
3. For flameproof installation the optional explosion proof enclosure is required and explosion proof installation methods must be followed. Refer to Figure 1-6.

4. The shielded cable must be used for hook up. The shield should be connected to chassis ground at the transmitter end and should be taped up and not connected at the receiver end. Insulation of the shield at the receiving end is especially important for intrinsically safe installations.
5. The maximum resistance of the loop resistor, the associated cable and the barrier is determined by the power supply voltage and is shown graphically in Figure 1-9.
6. The pulse and alarm outputs function as isolated switch closures (optically isolated open collector-emitter) and must be supplied with a power source, as shown in wiring diagram, Figure 1-5. Observe polarity and do not exceed 30 volts for the supply and limit load current to 20 mA for each output.
7. The zero function is activated by momentarily shorting the zero terminals on the wiring block. This may be accomplished with any conductive jumper or a switch which can be remotely mounted. The hazardous area classification will determine the wiring methods used for this switch.
8. After installation and powering of the loop, the transmitter must be zeroed, both electrically and mechanically. This operation will compensate for any stray magnetic effects in the vicinity of the transmitter. Flow must be zero and when the zero function is momentarily activated. The pointer must also be adjusted to the reference line on the scale using the adjustment screw on the face of the pointer, next to the hub. The zero function may be activated as part of a periodical maintenance check.
9. Under actual flow conditions, verify that the transmitter output matches the mechanical pointer position and that the alarms and pulse outputs are working properly. If a discrepancy is noted, the HART communications channel can be used to verify or adjust the transmitter settings. The HART hand held communicator provides a simple means to accomplish this check anywhere in the loop.

2-7 Installation of the Model MT3809 Flowmeter with a Transmitter with Inductive Alarms (1 or 2 switches)

a. Install the meter as described in Section 2-5
b. Install the transmitter as described in Section 2-6
c. Install the inductive alarms as indicated below Section 2-8

2-8 Installation of the Model MT3809 Flowmeter with Inductive Alarms (1 or 2 switches)

⚠WARNING

To prevent ignition of hazardous atmospheres and serious personal injury, proper installation methods must be used as defined in Article 505 of the National Electrical Code, and the Canadian Electrical Code and ISA Standard 12.6 and in accordance with Cenelec regulations.

Install the meter as described in Section 2-5

To install the inductive alarms (1 or 2 switches):
1. The inductive alarms can be supplied as a stand alone option or combined with the transmitter. Connections to the alarms are made inside the indicator housing. Refer to Figure 1-7 for stand alone inductive alarm installation and to Figures 1-6 and 1-8 for installation with the transmitter combined with the inductive alarms.

2. Intrinsically safe installations require the use of relay isolators for the alarms and a barrier for the transmitter, if equipped. Power supply limits and cable parameters must be as shown in the installation diagram.
3. If the area classification is Division 2, the transmitter barrier and cable parameters are not applicable. However for proper operation of the inductive alarms, the relay isolators must be used. The electrical code will require the use of conduit for wire protection.
4. For flameproof installation the optional explosion proof enclosure is required and explosion proof installation methods must be followed. For proper operation of the inductive switches, the relay isolators must be used.
5. The shielded cable must be used for hook up. The shields should connected to chassis ground at the transmitter/alarm end and should be taped up and not connected at the receiver end. The taping and insulation of the shields at the receiving end is especially important for intrinsically safe installations.
6. The relay isolator has built in power handling contacts. Refer to the specifications for these ratings.
7. The pointer must be adjusted to the reference line on the scale using the adjustment screw on the face of the pointer, next to the hub.
8. Proper operation of the inductive alarms can be determined by manually rotating the mechanical pointer and observing the status lights on the relay isolator. The small alarm pointers indicate the alarm trip points. Changes to the set points can be made by loosening the pointer screws and repositioning the pointers.

2-9 Installation of the Model MT3809 Flowmeter with Transmitter and Digital Display and Inductive Alarms

a. Install the meter as described in Section 2-5
b. Install the transmitter as described in Section 2-6
c. Install the inductive alarms as indicated below Section 2-8

3-1 Pre-Start Check

After the flowmeter has been properly installed in the process, it is ready for operation. When initiating flow, slowly open the valve to avoid a flow surge. Bypass is a help in bringing the flow on smoothly. Avoid starting a pump to supply the flowmeter without the use of a valve upstream of the flowmeter.

⚠WARNING

Do not operate this instrument in excess of the specifications listed in Section 1. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

At no flow condition the indicator pointer should align with the “R” mark on the scale. If necessary, adjust the pointer as per directions in the Maintenance Section 4.

3-2 Start-up and Operation of Flowmeter

⚠WARNING

Operating Procedure: Do not operate this instrument in excess of the specifications listed in Section 1. Before bringing the unit into operation, make sure that all fluid connections have been correctly tightened and that all electrical connections where applicable have been made. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

a. Slowly initiate flow into the system. Open process valves slowly to avoid flow surges.
b. Check for leaks around the meter inlet and outlet connections. If no leaks are present, bring the system up to operating pressure.

⚠ CAUTION

Any sudden change in system pressure may cause mechanical damage to elastomer materials. Damage can occur when there is a rapid expansion of fluid that has permeated elastomer materials. The user must take the necessary precautions to avoid such conditions.

3-3 Operation of the Model MT3809 Flowmeter with a Transmitter with or without Optional Alarms and Pulse Output for Totalization

***** Start-up the meter as described in Section 3-2.
* Programming performed prior to shipment (parameters).
The transmitter with or without alarms and pulse output is preprogrammed prior to shipment for the following parameters based on the order information, meter configuration and application. If parameters are not specified in the customer purchase order, the defaults inherent to the electronics will be as shown in (parenthesis).

Transmitter only pre-programmed parameters	**Transmitter plus alarms and pulse output preprogrammed parameters**
Model Number	Alarm LoLimit (0% FS flow)
Serial Number	Alarm HiLimit (100% FS flow)
Tag Name (blank)	Pulse output units (1 ppl)
Flow Rate units of measure (lpm)	Resettable totalizer units of measure (lit.)
Low Flow cutoff (5% FS flow)	Inventory totalizer units of measurement (lit.)
Calibration factor (% scales only)	
Analog Output LoRange (4 mA @ 0% flow)	
Analog Output HiRange (20 mA @ 100% flow)	

* Manual programming or reprogramming of the electronics.
Programming of the transmitter with or without alarms and pulse output may also be done locally via an HART Communicator. Please refer to the manual of the communicator for detailed description of operation or Figure 3-1.

***** Recalibration of analog transmitter output (spanning high and low)
At any time after factory calibration, shipment, installation, or service, the transmitter can be recalibrated by overwriting any of the previous calibration point-pairs, assuming that the user can provide a series of accurate rates of flow through the meter. If preferred, the meter with transmitter may be returned for recalibration at the Brooks service department for a fee.

***** Basic transmitter setup parameters
These are meter identification parameters set prior to shipment of the meter.
Flowmeter identification: Model number, serial number, tag name.
Flowmeter configuration: Low flow cutoff, calibration factor, flow rate units of measure.
Transmitter analog output: Analog output HiRange, analog output LoRange.

***** Optional programmable alarm and pulse output parameters and features
Alarm contact output: HiLimit, LoLimit
One or two digital outputs are available for alarm signals. Contact output polarity is configurable as normally open (N.O.) or normally closed (N.C.).

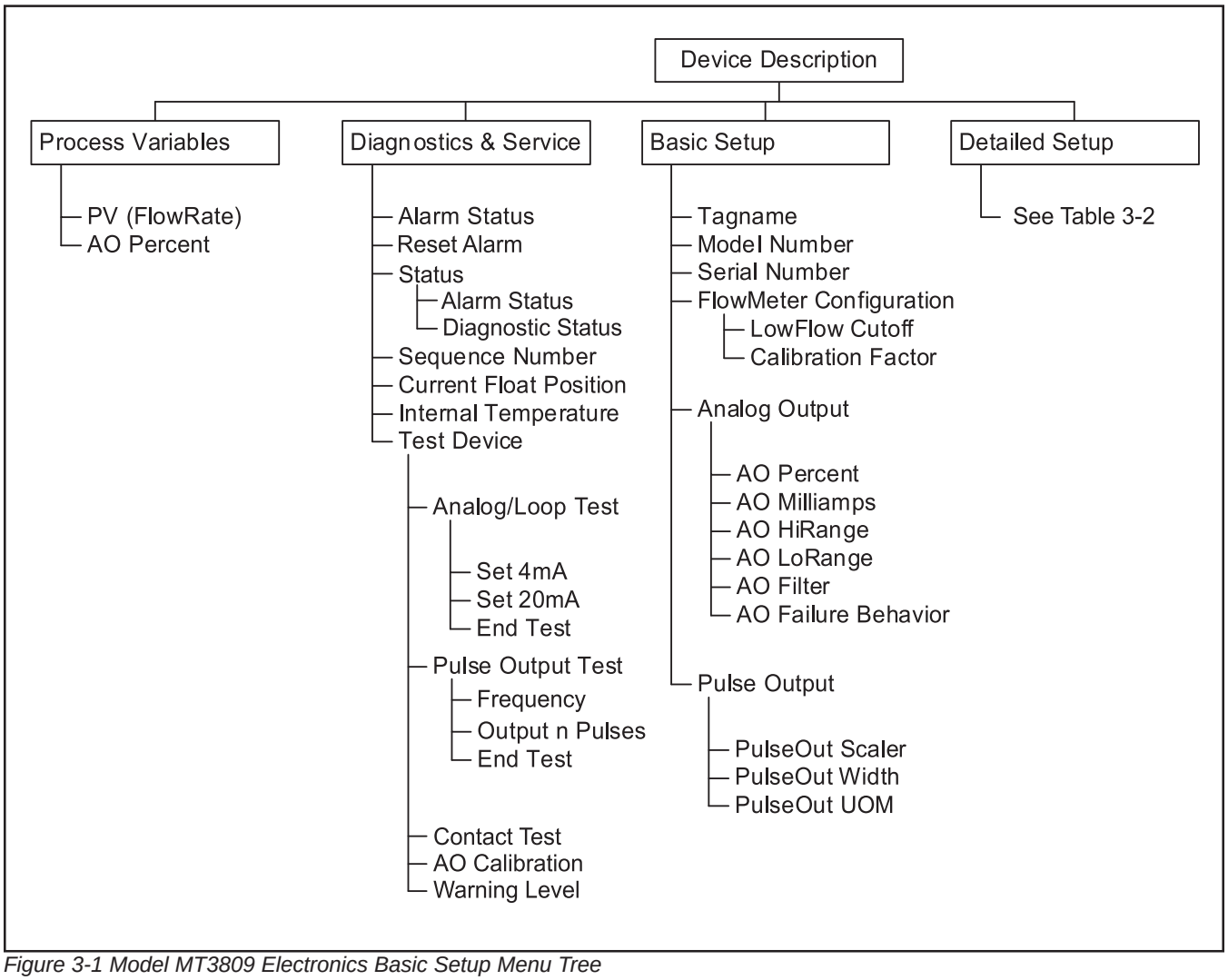


Figure 3-1 Model MT3809 Electronics Basic Setup Menu Tree

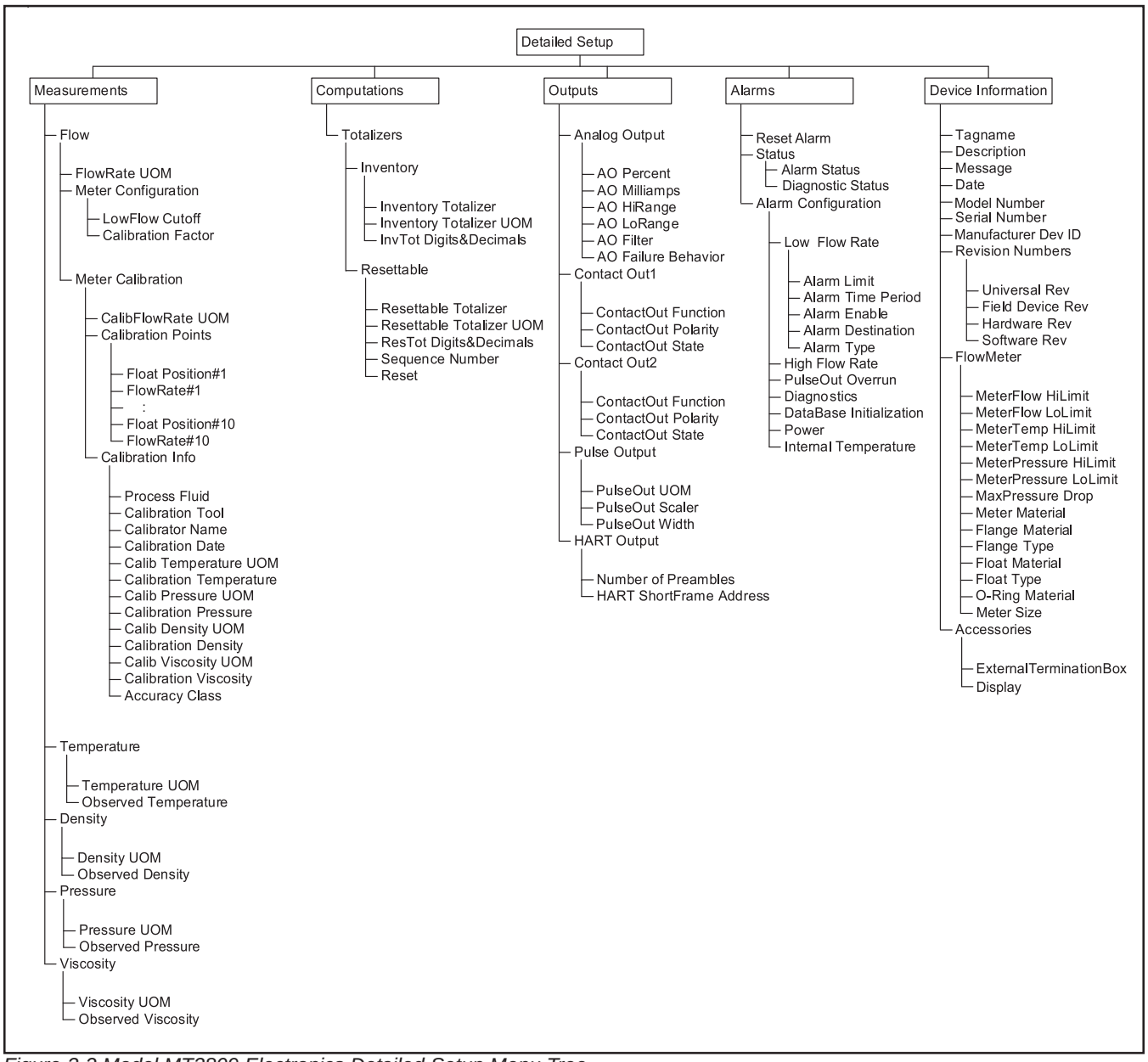


Figure 3-2 Model MT3809 Electronics Detailed Setup Menu Tree

The alarms may be set at the minimum and maximum flow rate or at any other preferred high and low limits. The units of measure of the alarm limits are the same units of measure as the process variable itself.

Computations: Totalization
Totalizers are available in both resettable and inventory options. Resettable totalization is used for batching while inventory totalization measures the total volume over time. Units of measure are set independently for each of these options.

Pulse output: Pulse out scaler, pulse out width
The transmitter has a pulse output channel that indicates flow rate as a variable frequency and therefore can pass information to many types of external equipment such as batch controllers, automation systems or provers. The output pulse width default is 1 millisec but may be user-configured since certain external receiving equipment cannot keep up with high incoming frequency.

Low flow cutoff warning for pulse output and totalization
The low flow cutoff parameter can be programmed to signal when the flow level is below which the process is intended. Below this level, the totalizer will assume that the flow rate is actually zero and that no data should be accumulated by the totalizers.

Pulse output overrun alarm
If a larger than acceptable output pulse width is configured, totalizer pulses may be delayed or queued. No loss of pulses will occur. The totalizer output pulses will to be sent until the queue is empty. Under these circumstances, an alarm message will be sent to the control station. However, the alarm can be disabled if not required.

Optional alarm configurations- enable, destination, alarm type (latching)
Three additional parameters may be programmed for process and diagnostic alarms to control functionality- enable, destination, and alarm type (latching). ‘Enable’ allows alarms to be enabled and disabled depending on use of the alarm. For example, if output pulses are being used it may be normal practice to delay (e.g. queue up) output pulses because of a slow receiving end-device that requires a wide pulse-width. The ‘enable’ parameter allows the user to *disable* the pulse output overrun alarm and not send an alarm when in fact pulse outputs are delayed by choice. Some critical diagnostic alarms, such as database initialization, can not be disabled or turned off. When an alarm occurs, it can be posted through the defined ‘destination’ digital contact closure outputs #1, #2 both or neither. Therefore the alarms may be managed according to local operating practices and the need to notify upstream control/safety systems.

An alarm may be posted at a designated destination only when the alarm situation is occurring or posted until the alarm is acknowledged by the operator. The decision to ‘latch or unlatch’ the alarm is controlled by setting the ‘alarm type’ parameter. By utilizing this optional parameter, the operator can see that there is an alarm as it is occurring (unlatched) or even after the fact, in the case when the operator did not directly observe the unit alarm (latched).

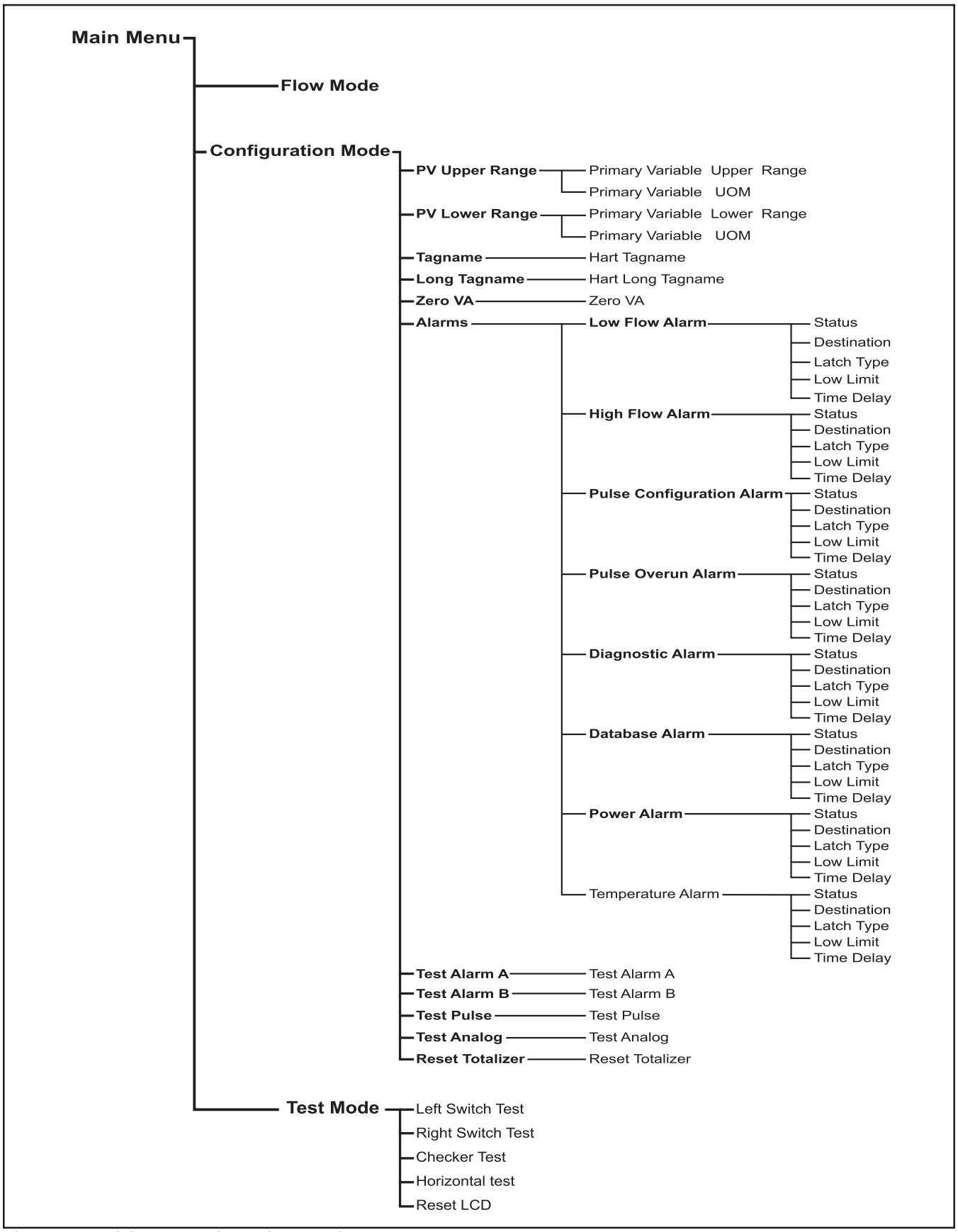


Figure 3-3 Model MT3809 Electronics LOI Chart Menu

3-4 Operation of the Model MT3809 Flowmeter with a Transmitter and Inductive Alarms (1 or 2 switches)

a. Start-up the meter as described in Section 3-2.
b. Start-up the transmitter as described in Section 3-3.
c. Start-up the inductive alarms as described in Section 3-6.

3-5 Operation of the Model MT3809 Flowmeter with a Transmitter and Display

The output of the 4-20 mA transmitter drives the LCD display option. The LCD display is a three line liquid crystal display. It can easily be programmed to provide basic information such as flow rates and product totalization. Configuration adjustments to upper/lower range values can also be performed using the display. Access to the display can be accomplished by removing the cover or by using the supplied magnet with the cover in place. Refer to Figure 3-3 for the menu tree for more details.

3-6 Operation of the Model MT3809 Flowmeter with Inductive Alarms (1 or 2 switches)

a. Start-up the meter as described in Section 3-2.
b. To modify the alarm set points, remove the front cover with gasket of the indicator housing by removing the four screws.
c. Set the alarm position by loosening the two pointer screws, moving the pointer to the desired alarm setting and tightening the screws.
d. Replace the indicator housing cover with gasket and secure with the four screws.

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4-1 General Service Information

⚠ WARNING

METER/CONTROLLER SEAL COMPATIBILITY

Products in this manual may contain metal or elastomeric seals, gaskets, O-rings or valve seats. It is the "user's" responsibility to select materials that are corrosion resistant and compatible with their process and process conditions. Using materials that are not compatible with the process or process conditions could result in the Meter or Controller leaking process fluid outside the pressure boundary of the device, resulting in personnel injury or death.

It is recommended that the user check the Meter or Controller on a regular schedule to ensure that it is leak free as both metal and elastomeric seals, gaskets, O-rings and valve seats may change with age, exposure to process fluid, temperature, and /or pressure.

⚠ WARNING

If it becomes necessary to remove the instrument from the system power to the device is disconnected at the power supply.

⚠ WARNING

If it becomes necessary to remove the flowmeter from the system after exposure to toxic, pyrophoric, flammable or corrosive gas, purge the flowmeter thoroughly with a dry inert gas such as Nitrogen before disconnecting the gas connections. Failure to correctly purge the flowmeter could result in fire, explosion or death. Corrosion or contamination of the flowmeter upon exposure to air, may also occur.

⚠ CAUTION

It is important that this device only be serviced by properly trained and qualified personnel.

⚠ WARNING

If this equipment is not properly serviced, serious personal injury and/or damage to the equipment can result from potentially high operating pressures. Process line pressure should be removed prior to servicing.

There is no routine maintenance required for the Models MT3809 and MT3810 flowmeters. However should it become necessary to replace, adjust or remove components of the flowmeter, specific recommendations must be followed.

4-2 Meter Float Replacement and Cleaning (MT3809 & MT3810)

Float replacement procedures are dependent on the meter size, connection type and fluid (gas vs. liquid) application. Please refer to the appropriate section below for instructions along with Figures 4-1 thru 4-4.

1. Flanged Connection

a. Size 7 (½") flanged, liquid or gas service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Remove the gasket support ring. A bearing puller of the correct size is recommended to remove the gasket support ring.
3. Push the entire float assembly slowly downward and out of the meter inlet by pushing from the top with a round bar stock (3/4" or 19 mm diameter).
4. Remove the float snap-ring to clean individual float assembly parts.
5. Reassemble the meter by reassembling the float assembly and inserting it into the bottom of the meter. Replace the spiral retaining ring in the meter inlet.

b. Size 8 (½") flanged, liquid service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Remove the gasket support ring. A bearing puller of the correct size is recommended to remove the gasket support ring
3. Loosen the float assembly with two screwdrivers one on each end of the meter and turn to loosen the inlet and outlet screws. Remove inlet screw at the bottom of the meter.
4. Remove the guide vane at the bottom of the meter and gently push the float assembly up and out the top/outlet side.
5. Reassemble by inserting the float assembly into the top of the meter. Replace the guide vane and secure the float assembly by tightening the inlet and outlet screws. Replace the spiral retaining ring in the meter inlet.

c. Size 8 (½") flanged, gas service
1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Remove the gasket support ring. A bearing puller of the correct size is recommended to remove the gasket support ring.
3. Secure the damper from turning by inserting a 1/8” pin through the top guide cartridge. While holding the damper in place, remove the top/outlet screw.
4. Push the float assembly out through the inlet/bottom.
5. To clean the gas damper, unscrew the cylinder head. Then remove the bolt and carefully take out the small piston so as to not damage the critical surfaces.
6. Reassemble the meter by assembling the damper with float assembly. Insert the float assembly with damper into the inlet/bottom of the meter. Secure the inlet/bottom screw. While holding the damper in place with a pin(1/8” diameter), insert and secure the top/outlet screw. Replace thespiral retaining ring.

d. Sizes 10 (1"), 12 (1½"), 13 (2") flanged, liquid service
1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Remove the gasket support ring. A bearing puller of the correct size is recommended to remove the gasket support ring.
3. Loosen the inlet and outlet screws. Remove inlet screw at the bottom of the meter.
4. Remove the guide vane at the bottom of the meter and gently push the float assembly up and out the top/outlet side.
5. Reassemble by inserting the float assembly into the top of the meter. Replace the guide vane and secure the float assembly by tightening the inlet and outlet screws.

e. Sizes 10 (1"), 12 (1½"), 13 (2") flanged, gas service
1. Remove the gasket support ring. A bearing puller of the correct size is recommended to remove the gasket support ring.
2. Secure the damper from turning by inserting a 1/8” pin through the top guide cartridge. While holding the damper in place, remove the top/outlet screw.
3. Push the float assembly out through the inlet/bottom.
4. To clean the gas damper, unscrew the cylinder head. Then remove the bolt and carefully take out the small piston so as to not damage the critical surfaces.
5. Reassemble the meter by assembling the damper with float assembly. Insert the float assembly with damper into the inlet/bottom of the meter. Secure the inlet/bottom screw. While holding the damper in place with a pin (1/8” diameter), insert and secure the top/outlet screw. Replace the spiral retaining ring.

f. Sizes 15 and 16 (3" and 4") flanged, liquid or gas service (size 15 only)
1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Loosen the float assembly by fixating two pliers one on each end of the float assembly inlet guide cartridge. Turn to loosen with the help of a pin wrench.
3. Carefully remove the complete float assembly and conical taper as well as the spacer bushing (size 16 only) out the inlet/bottom of the meter.

4. Reassemble by inserting the float assembly inside the conical taper (as well as the spacer bushing, size 16 only). Then insert the complete float assembly into the bottom of the meter. Replace the float assembly inlet guide cartridge and tighten the float assembly into place.

2. NPT Connection

a. Size 7 (½") NPT, liquid or gas service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Unscrew the inlet fitting at the bottom of the meter.
3. Push the entire float assembly slowly downward and out of the meter inlet by pushing from the top with a round bar stock (3/4” or 19 mm diameter).
4. Remove the float snap-ring and clean individual float assembly parts.
5. Reassemble the meter by reassembling the float assembly and inserting it into the bottom of the meter. Reinstall and secure the inlet fitting.

b. Size 8 (½"), 10 (1"), 12 (1½") NPT liquid service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Unscrew the inlet fitting at the bottom of the meter.
3. Loosen the float assembly with two screwdrivers one on each end of the meter and turn to loosen the inlet and outlet screws. Remove inlet screw at the bottom of the meter.
4. Remove the guide vane at the bottom of the meter and gently push the float assembly up and out the top/outlet side.
5. Reassemble by inserting the float assembly into the top of the meter. Replace the guide vane and secure the float assembly by tightening the inlet and outlet screws . Reinstall and secure the inlet fitting.

c. Size 8 (½”) NPT gas service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Unscrew the outlet fitting at the top/outlet of the meter and remove the gas damper.
3. Unscrew the inlet/bottom fitting and slowly remove the float assembly.
4. To reassemble the meter, insert the float assembly into the inlet/bottom of the meter. Secure the inlet/bottom fitting. Replace the gas damper and secure the outlet/top fitting.

d. Size 10 (1"), 12 (1½") NPT, gas service

1. Remove the meter from the process line and lay the meter horizontal on a table.
2. Remove the top/outlet screw.
3. Loosen the float assembly by holding the damper in place with a pin (1/8” diameter) in the top while loosening the inlet/bottom fitting. Gently push the float assembly out through the inlet/bottom.
4. To clean the gas damper, unscrew the cylinder head. Then remove the bolt and take out the small piston carefully so as to not damage the critical surfaces.
5. Reassemble the meter by inserting the float assembly with damper into the inlet/bottom of the meter. Secure the inlet/bottom screw by holding the damper in place with a pin (1/8” diameter). Replace and secure the top/outlet screw. Reinstall and secure the inlet fitting.

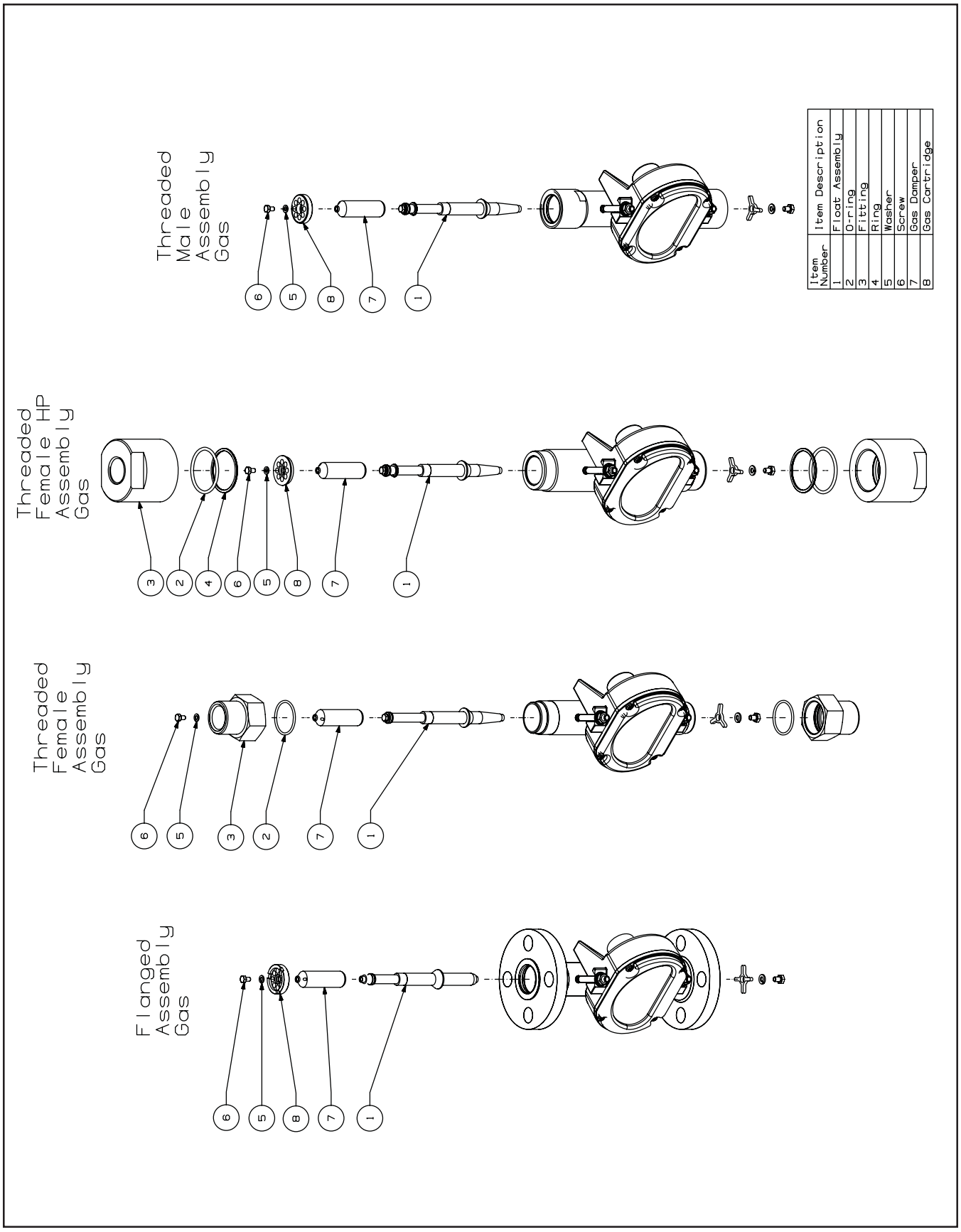

Figure 4-1 Exploded View, Model MT3809G and MT3810G - Gas Service

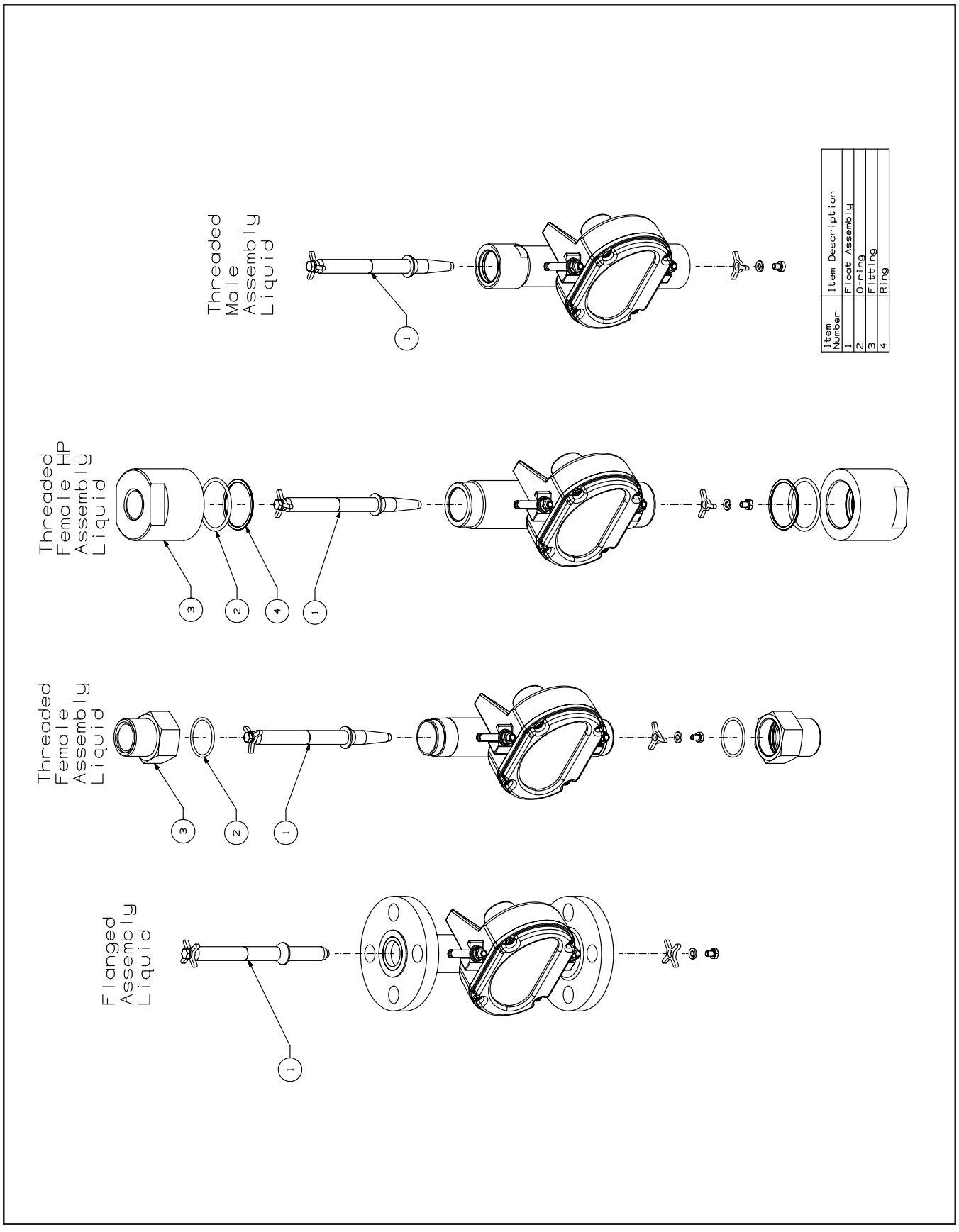

Figure 4-2 Exploded View, Model MT3809G and MT3810G - Liquid Service

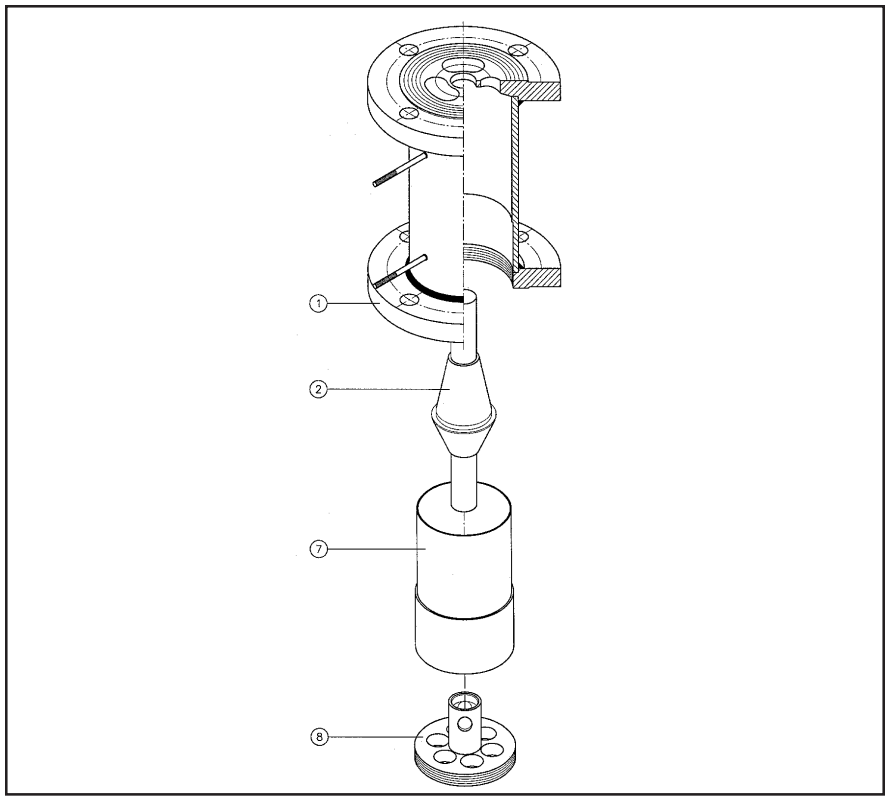

Figure 4-3 Exploded View, Model MT3809G, Size 15 (Gas or Liquid Service Only)

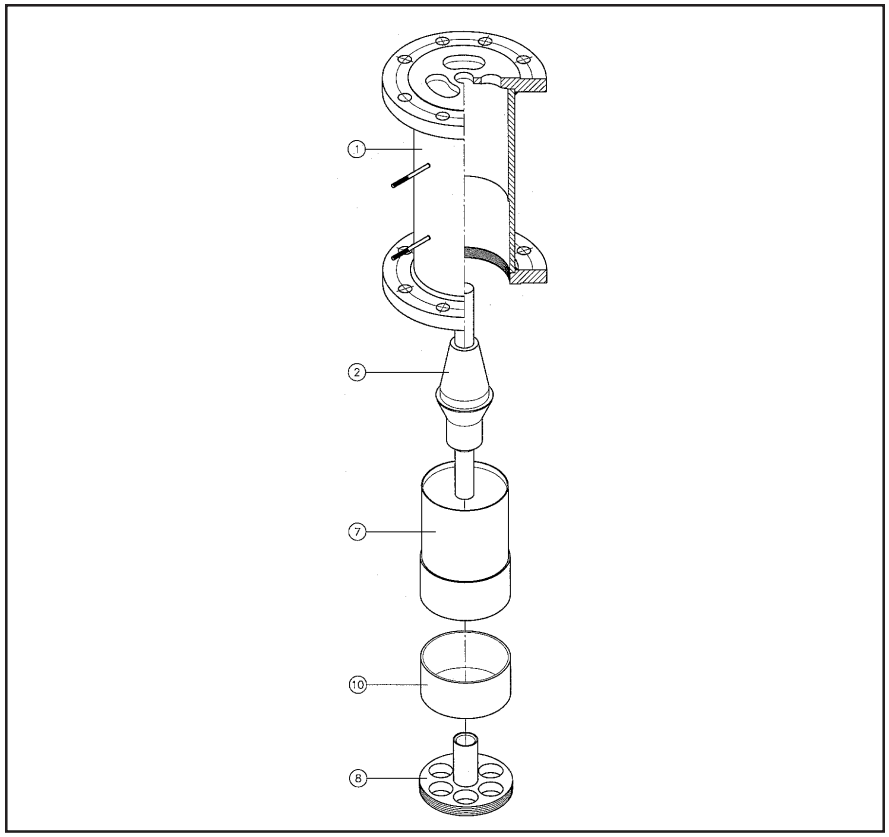

Figure 4-4 Exploded View, Model MT3809G, Size 16 (Liquid Service Only)

4-3 Meter Float Replacement and Cleaning (MT3809 ETFE Option) (Refer to Figure 4-5)

Flanged connections, all sizes, liquid or gas

a. Remove the meter from the process line and lay the meter horizontal on a table.
b. With a screwdriver, carefully loosen the inlet and outlet inserts.
c. Continue to pull until the inlet and outlet inserts are removed from the meter.
d. Remove the float and conical taper from the meter.
e. Reassemble by reinserting the float and tapered insert. And then gently push the inlet and outlet inserts into the flanges. Sizes 10 (1"), 12 (1½") and 13 (2") meters, be careful to line up the top of the float assembly shaft with the outlet insert to ensure proper fit.

4-4 Meter Indicator Reference Mark (zero) Adjustment

This adjustment is performed with no process flow with the float resting on the guide vane or the inlet end fitting.

a. Completely stop fluid flow through the indicator.
b. Remove the four screws securing the indicator housing window and remove the gasket and cover.
c. Turn the slotted screw on the bottom of the point until the pointer is in line with the reference (zero) mark on the scale.
d. Replace the indicator housing cover with gasket and secure with the four screws.

4-5 Transmitter Replacement with or without Alarms and Pulse Output

All transmitters are self contained units matched specifically to the associated flowmeter. If there is a need to replace, please contact your nearest authorized Brooks service representative.

4-6 Inductive Alarm Replacement

a. Remove the front cover of the indicator housing by removing the three screws securing it.
b. The wires from the alarm switch(es) are wired into the alarm terminal connector.
c. Loosen the two screws securing the scale, with the alarm switches attached, and remove the scale.
d. Remove the two screws securing the wire cover.
e. Turn the wire cover over to expose the alarm terminal blocks.
f. Remove the wires from the terminal blocks
g. Turn the scale over and locate the screw centered in the green alarm switch. Remove the screw being careful not to lose the nut on the outside of the alarm set bracket. Remove the alarm switch from support.
h. Place the switch on the bracket with the open end facing towards the center of the scale plate and the wires facing away from the scale plate.
i. Place the switch screw through the opening in the switch, and the support bracket. Use the nut to secure the screw and tighten.
j. Connect the alarm switch wires to the terminal block. Refer to Alarm Wiring Diagrams figures 1-5A & B, 1-6A & B, 1-7A & B and 1-8A & B.

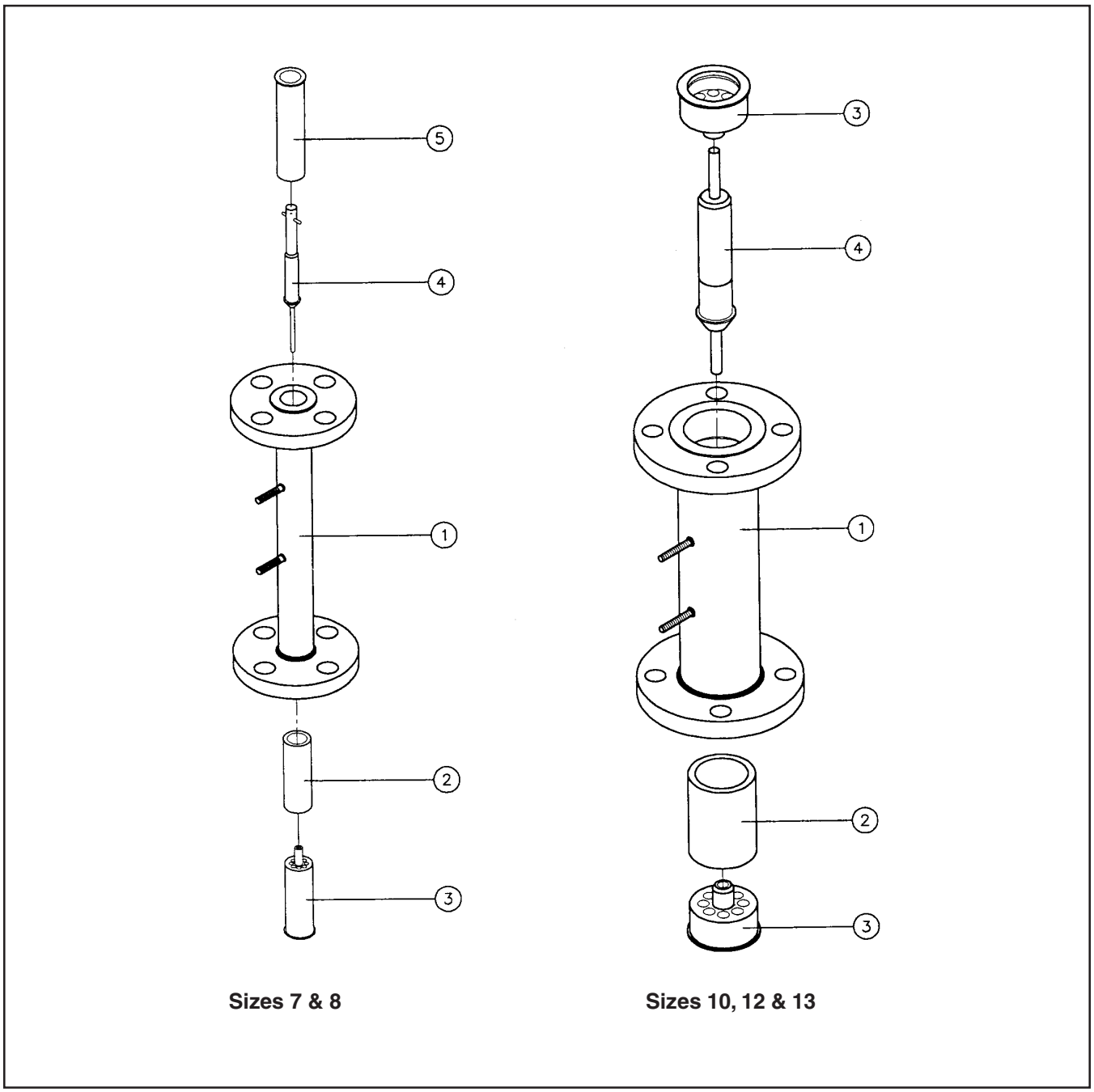

Figure 4-5 Meter Float Replacement & Cleaning (ETFE Option)

k. Replace the scale and tighten two clamping screws. Make sure that the alarm switch wires do not interfere with the alarm cam. Insure that the pointer is aligned with the 'R' or zero mark. If not, refer to Section 4-3, indicator reference mark (zero) adjustment.
i. Set the alarm position, by loosening the two pointer screws, moving the point of the desired alarm setting, and tightening the screws.
j. Connect the field wiring.
k. Replace the indicator housing cover and secure with four screws.

4-7 Transmitter Replacement with Inductive Alarms

The transmitter is a self contained unit matched specifically to the associated flowmeter. If there is a need to replace, please contact your nearest authorized Brooks service representative. However, the inductive alarms may be replaced according to the procedure in Section 4.6

4-8 Monitoring the Integrity of the Transmitter Electronics-Diagnostic Alarms

As part of its normal operations, the transmitter continuously monitors its own internal health. Automatic diagnostics can trigger alarms indicating poor communications, memory integrity, or sensor problems. The user can define whether these malfunctions are serious and instruct that a 4-20 mA analog- signal be sent automatically to a receiving devices such as a DCS or PLC system.

a. Power failure alarm
The power failure alarm will occur when the current-loop is broken and then restored. In this case, the transmitter will raise the power-fail alarm to notify the user that there was a gap in data collection. The 4-20 mA loop provides all internal power for the SMM electronics. However, if power is lost, the setup parameters are internally stored in nonvolatile memory (lithium battery) and maintained in the event that external power is disconnected.

b. Database-initialization alarm will occur when the transmitter powers up and finds that the internal parameter database was not saved properly and must return parameters to the inherent defaults.

c. High internal temperature alarm
Should the electronics unit exceed functional limits (70°C), this information will be indicated.

4-9 Digital Display Replacement

The digital display is a self contained unit matched specifically to the associated flowmeter. If there is a need to replace, please contact your nearest authorized Brooks service representative.

Bulgarian

Основни инструкции Прочетете преди работа!

Brooks Instrument проектира, произвежда и тества продуктите си по такъв начин, че те да отговарят на многобройни национални и международни стандарти. Тези оборудвания трябва правилно да се инсталират, експлоатират и поддържат за да се гарантира, че ще могат да работят съответно на техните нормални спецификации. Следващите инструкции трябва да се спазват и трябва да се включат в програмата за безопасност на труда при инсталирането, експлоатацията и поддръжката на продуктите на Brooks Instrument.

- За да се гарантира характерната производителност, инсталирането, експлоатацията, актуализирането, програмирането и поддръжката на продукта трябва да се извършват само от квалифициран персонал.
- Прочетете всички инструкции преди инсталирането, експлоатацията и поддръжката на продукта. Ако това ръководство не е съответстващото издание, вижте на задната обложка информацията за контакт с местния търговски офис. Запазете това ръководство за по-късно информиране.

⚠ **ВНИМАНИЕ: Не работете с оборудването извън диапазоните, указани в инструкцията и ръководството по експлоатация. Неизпълнението на това може да доведе до сериозни телесни повреди и / или повреждане на оборудването.**

- Ако не разбирате някои инструкциите, свържете се с представителя на Brooks Instrument за изясняване на проблема.
- Спазвайте всички предупреждения, призови и инструкции означени върху оборудването или доставени заедно с него.
- Инсталирайте оборудването съответно на указанията в инструкцията за инсталиране и на действащите на местни и национални предписания. Свързвайте продуктите само към подходящи източници на електричество и налягане.
- Ход: (1) Бавно въведете системата под налягане. Бавно отворете работните клапани за да се избегнат колебанията на потока. (2) Проверете дали няма изтичане при входното и изходното съединение на разходомера. Ако няма изтичане, напълнете системата до работно налягане.
- Преди извършване на поддръжката непременно проверете дали работният тръбопровод не се намира под налягане. Ако са необходими резервни части, с определените от Brooks Instrument резервни части трябва да борави само квалифициран персонал. Неразрешените части и процедури могат да окажат влияние върху работата на продукта, и също да застрашат безопасността на експлоатацията. Заместването с неоригинални части може да доведе до пожар, опасност от токов удар или неправилна работа.
- Всички врати на оборудването непременно да бъдат затворени, а защитните покрития да бъдат на мястото си, за да се избегнат токовите удари и телесните повреди, освен ако квалифицирани специалисти извършват работи по неговото поддържане.

⚠ **ВНИМАНИЕ: При оборудванията с протичащи течности, ако по някаква причина е необходимо да се затворят намиращите се до оборудването изходни и входни клапани, оборудването трябва напълно да се изпразни. Неизпълнението на това може да причини топлинно разширение на течността, което може до спука оборудването и да доведе до телесни повреди.**

Европейска директива за уреди под налягане (PED)

Всички съоръжения под налягане с вътрешно налягане над 0,5 bar (g) и с размер по-голям от 25 mm или 1" (инч), попадат под действието на европейската директива за уреди под налягане (PED).

- Глава „Технически данни" на настоящото ръководство съдържа свързаните с директивата PED инструкции.
- Указаните в настоящото ръководство измерителни уреди съответстват на европейската директива 97/23/ЕО.
- Всички разходомери на Brooks Instrument се отнасят към флуиди от група 1.
- Измерителните уреди по-големи от 25 mm или 1" (инч) съответстват на I, II или III категория според PED.
- Измерителните уреди с размери 25 mm или 1" (инч), или по-малки, следват добрата инженерна практика (SEP).

Европейска директива за електромагнитна съвместимост (EMC)

Носещото знака CE (електрическо/електронно) оборудване на Brooks Instrument е изпълнило успешно тестовете за проверка на изискванията за електромагнитна съвместимост (директива EMC 2004/108/EC).
Особено внимание трябва да се обръща обаче на избирането на сигналните кабели, използвани с оборудването, носещо знака CE.
Качество на сигналните кабели, кабелните салници и съединители:
Brooks Insturment предлага висококачествени кабели, отговарящи на изискванията на CE сертификацията.
Ако използвате собствен сигнален кабел, трябва да изберете такъв, който е напълно защитен със 100%-ово екраниране.
Съединителите тип „D" или „кръгов" трябва да бъдат екранирани с метален щит. При необходимост за фиксирането на щита на кабела трябва да се използват метални кабелни салници.
Щитът на кабела трябва да се свърже с металното покритие или металния салник и в двата края да се екранира в 360°. Щитът трябва да бъде заземен.
Съединителите за печатни платки са стандартно неметални. Използваните кабели трябва да бъдат защитени със 100%-ово екраниране, за да отговарят на CE сертификацията.
Щитът трябва да бъде заземен.
Конфигурация на контактите: Виж приложената инструкция за експлоатация.

Електростатичен разряд (ESD)

⚠ **ВНИМАНИЕ: Приборът съдържа електронни компоненти, които са чувствителни към статичното електричество и могат да се повредят от него. Трябва да се спазват съответните процедури по време на изваждане, слагане или друго боравене с вътрешните монтажни платки и устройства.**

Процедура за работа:

1. Изключете оборудването.
2. Персоналът трябва да се заземи с гривна или друго безопасно и подходящо за целта средство, преди да инсталира, изважда или регулира монтажна платка или друго вътрешно устройство.
3. Печатните монтажни платки трябва да се транспортират в проводяща опаковка. Печатните платки могат да се изваждат от защитното покритие само непосредствено преди инсталирането. Отстранените печатни платки незабавно трябва да се сложат в защитна опаковка, служеща за транспортиране, складиране или връщане на производителя.

Забележки:
Не е уникално явление, че този прибор съдържа чувствителни към електростатичния заряд (ESD) компоненти. Болшинството от съвременните електронни прибори съдържат компоненти, изготвени по технология метал-окис (NMOS, SMOS и т.н.). Опитът доказва, че даже и малко количество статическо електричество може да повреди или съсипе тези прибори. Повредените компоненти даже ако привидно работят правилно, проявяват начални неизправности.

Czech

Základní instrukce
Před instalací si přečtěte následující instrukce!

Společnost Brooks Instrument konstruuje, vyrábí a testuje tento produkt tak, aby splnil mnoho národních a mezinárodních standardů. Přístroje musí být řádně nainstalovány, používány a udržovány tak, aby byl zajištěn jejich nepřetržitý provoz v rámci normálních technických specifikací. Musíte dodržovat následující pokyny a integrovat jejich obsah do svého bezpečnostního programu při instalování, používání a udržování produktů společnosti Brooks.

- Pro zajištění správné funkce zařízení mohou jeho instalaci, obsluhu, programování, údržbu a aktualizace firmwaru provádět výhradně kvalifikované osoby.
- Před instalací, provozem a údržbou produktu si prostudujte všechny pokyny. Pokud tato příručka není tou správnou příručkou pro dané zařízení, informujte se na zadní straně obálky o kontaktu na místní prodejní kancelář. Uchovejte si tuto příručku pro pozdější potřebu.

⚠ UPOZORNĚNÍ: Neprovozujte zařízení v rozsahu mimo daný rozsah v provozní příručce. Porušení tohoto upozornění může mít za následek vážné újmy na zdraví a vést k poškození zařízení.

- Pokud některým pokynům nerozumíte, kontaktujte svého prodejního zástupce společnosti Brooks a vyžádejte si objasnění.
- Dodržujte všechny výstrahy, upozornění a pokyny, uvedené a vyznačené na produktu, nebo s ním dodané.
- Namontujte zařízení specifikovaným způsobem podle správné montážní příručky a podle platných místních a národních předpisů. Připojte všechny produkty ke správným zdrojům elektrické energie a stlačených médií.
- Postup: (1) Pomalu do systému přivádějte médium. Pro zabránění vzniku rázů v systému otvírejte procesní ventily postupně. (2) Překontrolujte těsnost vstupního a výstupního připojení průtokoměru. Pokud nezjistíte žádné netěsnosti, postupně zvedejte tlak na provozní hodnotu.
- Před prováděním servisních prací zkontrolujte, zda systém není pod tlakem. V případě potřeby výměny dílů zajistěte, aby byly použity náhradní součásti specifikované společností Brooks Instrument a výměnu prováděla kvalifikovaná osoba. Použití neschválených dílů a postupů může negativně ovlivnit efektivitu a bezpečnost procesu. Použití náhrad za originální díly může způsobit požár, úraz elektrickým proudem nebo nesprávnou funkci.
- Pokud není zrovna prováděna údržba kvalifikovanou osobou, ujistěte se, že zařízení je opatřeno všemi předepsanými kryty.

⚠ UPOZORNĚNÍ: Pokud je u zařízení s průtokem kapalin nutno z jakéhokoli důvodu uzavřít vstupní a výstupní ventily, je nutné zařízení kompletně vyprázdnit. Pokud tak neučiníte, může z důvodu teplotní roztažnosti zbytků média v zařízení dojít k jeho poškození nebo k ohrožení zdraví osob.

Evropská směrnice pro tlakové zařízení (PED)

Na veškerá tlaková zařízení s vnitřním tlakem vyšším než 0,5 baru (g) a velikosti větší než 25 mm nebo 1" (palec) se vztahuje platnost směrnice o tlakovém zařízení (PED).
Kapitola „Technické údaje“ v této příručce obsahuje důležité bezpečnostní a provozní pokyny související se směrnicí PED.

- Měřicí přístroje popsané v této příručce jsou v souladu se směrnicí EN 97/23/ES.
- Všechny průtokoměry společnosti Brooks Instrument spadají do rámce Kapaliny, skupina I.
- Měřicí přístroje větší než 25 mm nebo 1" (palec) jsou v souladu se směrnicí PED, kategorii I, II nebo III
- Měřicí přístroje s velikostí 25 mm nebo 1" (palec) a menší spadají do rámce Správných technických postupů (SEP).

Evropská směrnice pro elektromagnetickou kompatibilitu (EMC)

Elektrické/elektronické zařízení Brooks Instrument nesoucí značku CE bylo úspěšně testováno dle předpisů pro elektromagnetickou kompatibilitu (směrnice EMC č. 2004/108/EC).
Výběru signálních kabelů pro použití se zařízením označeném CE je nutné věnovat zvláštní pozornost.
Kvalita signálních kabelů, kabelových průchodek a konektorů:
Brooks Instrument dodává vysoce jakostní kabely splňující požadavky kvalitativního zařazení CE. Pokud chcete použít vlastní signální kabely, zvolte typy s kvalitním stíněním všech žil a v celé délce trasy.
V případě použití konektorů kruhových nebo tvaru „D“, musí mít tyto kovové stínění. V případě jejich použití, musí kovové kabelové průchodky být propojeny se stíněním kabelu.
Stínění by mělo být připojené ke kovovému tělesu přístroje nebo krytu, na obou koncích kabelu a po celém jeho obvodu.
Stínění by mělo být uzemněno.
Přípojky vedoucí ke kartám podle norem jsou nekovová. Pro splnění požadavků předpisů CE musí být použité kabely kompletně stíněny.
Stínění by mělo být uzemněno.
Konfigurace kontaktů je uvedena v přiloženém návodu k obsluze.

Elektrostatický výboj (ESD)

⚠ UPOZORNĚNÍ: Tento přístroj obsahuje komponenty citlivé na poškození statickou elektřinou. Při montáži, demontáži či jiné manipulaci s vnitřními elektronickými obvody je potřeba dodržovat příslušné postupy.
Postup ošetřování:

1. Odpojte přístroj od napájení.
2. Osoba provádějící údržbu má být při instalaci, vyjímání či práci na desce plošných spojů nebo jiné vnitřní elektronice uzemněna zemnícím náramkem, nebo jiným vyhovujícím způsobem.
3. Desky plošných spojů je nutné přepravovat v elektricky vodivém obalu. Plošné spoje vyjímejte z vodivého obalu až bezprostředně před instalací do přístroje! Plošné spoje vyjmuté z přístroje a určené pro další využití, opět neprodleně umístěte do ochranného obalu.

Poznámky:
Existence prvků, citlivé na elektrostatické výboje (ESD) v přístrojích je častým jevem. Prvky s technologií oxidu kovů (NMOS,SMOS) jsou používány u většiny moderních elektronických zařízení. Zkušenosti dokazují, že i jen malé elektrostatické výboje mohou poškodit nebo zničit tyto zařízení. U poškozených součástek, jakkoli zdánlivě pracujících bezchybně, dochází brzy k poruše.

Dansk

Grundlæggende vejledninger Læs disse før anvendelse!

Brooks Instruments designer, fremstiller og afprøver sine produkter således, at de tilpasser sig både de indenrigs og internationale standarder. Disse udstyr bør installeres, bruges og repareres omhyggeligt, så at de kan virke tilsvarende deres normale anvendelsesperiode. De følgende regler skal overholdes og implementeres under installeringen samt ved brug og reparation.

- For at garantere den passende kapacitet, er udstyrets installation, anvendelse, opdatering, programmering kun tilladt for kvalificeret personale. Alle vejledninger skal læses før produktets installation, anvendelse og reparation.
- Hvis denne manual ikke er den passende udgave, kontakt venligst jeres leverandør for yderligere information.
- Det anbefales at gemme denne manual for senere brug.

⚠ **OBS.: Udstyret må ikke anvendes til andet end det er angivet i brugsanvisningen. Hvis denne regel brydes, kan der forekomme alvorlige personskader eller brist på udstyret.**

Hvis vejledningerne ikke er forståelig, kontakt venligst Deres Brooks repræsentant for at afklare problemet som er opstået.

- Overhold alle regler, som er markeret eller leveret sammen med udstyret.
- Installer udstyret efter den angivne installationsvejledning og gældende lovgivning for anvendelsesområde. Udstyret må kun tilsluttes med kabler og stik som overholder kravspecifikationerne i vejledningen.
- Ibrugtagning: (1) Åbn langsomt for trykket i systemet.. Åbn langsomt for alle procesventiler for at forhindre ustabil gas flow. (2) Tjek systemet for lækage ved tilsluttet måleinstrumenter, samlinger og andet tilsluttet udstyr. Derefter øg trykket i systemet indtil arbejdstrykket er opnået.
- Før reparation tjek altid at procesledningen ikke står under tryk. Hvis der er brug for at udskifte defekte dele må kun kvalificeret personale udføre arbejdet og af sikkerhedsmæssige årsager må der kun anvendes originale Brooks reservedele. Det er ikke tilladt at anvende reservedele eller udføre arbejde der på nogen måde kan ændre produktet fra dens oprindelige specifikationer. Manglende overholdelse af de foreskrevne procedurer kan resultere i brænd, og fare for elektrisk stød eller kortslutning.
- Af sikkerhedsmæssige årsager sørg for at alle sikkerhedsforanstaltninger er overholdt. Eksempelvis at alle afskærmninger eller anden form for installationsbeskyttelse er lukket eller installeret ved normal drift.

⚠ **Advarsel.: Ved brug af udstyr som anvendes til væske skal det sikres at indgangsventilen og udgangsventilen ikke bliver lukket på samme tid i forbindelse med aftapning. Såfremt dette ikke overholdes, er der risiko for at væsken på grund af varmeudvikling ekspanderer og dette kan forårsage skade på udstyr og personer.**

Det Europæiske direktiv for trykudstyr (PED)

På alt udstyr hvis indgangstryk er større end 0,5bar (g) og større end 25 mm eller en tomme, gælder det europæiske direktiv for trykapparater. Manualens afsnit "tekniske data" indeholder anvisninger om PED direktivet.

- I manualen angives måleinstrumenter der er tilpasset direktivet 97/23/EK EU.
- Alle Brooks gennemstrømningsmålere tilhører væskegruppen nr. 1.
- Alle målinstrumenter som er større end 25 mm eller en tomme beskrives i direktivet PED´s kategorier I, II eller III.
- Alle målinstrumenter som er på 25 mm eller en tomme, eller mindre, beskrives i Sound Engineering Practice (SEP).

Det europæiske direktiv for elektromagnetisk kompatibilitet (EMC)

Alle Brooks instrumenter (elektrisk/elektronisk) som har CE markering er godkendt og testet ifølge om elektromagnetiske kompatibilitets forskrifter (EMC direktiv 2004/108/EC).
OBS: Man skal være opmærksom på hvilken type kabler der bruges til CE mærket udstyr..

Om kvalitet af signalkabler, kabeltilslutninger og koblinger:
Brooks tilbyder kabler af højest kvalitet, som er tilpasset CEE kvalificeringens forskrifter. Hvis man vælger at bruge egne kabler, skal man vælge et kabel som har den nødvendige afskærmning for at sikre 100 % mod udefra kommende støj.
Tilslutningerne "D" eller rundformede tilslutninger skal være afskærmet med skal af metal.
Stikket skal være afskærmet på alle sider. Al afskærmning skal jordes..
Card Edge tilslutninger er ifølge standarden ikke metalliske.. De anvendte kabler og stik skal være 100 % afskærmet for at opfylde CE kravene.. De skal ligeledes jordes.
For stik konfigurationen se vedlagte brugsvejledning.

Elektrostatisk afladning (ESD)

⚠ **OBS.: Udstyret indeholder tilbehør som kan skades ved elektrostatisk elektricitet. Alle forskrifter skal overholdes ved kontakt med alle elektriske komponenter både under drift og vedligeholdelse..**

Behandlingsproceduren:

1. Sluk for al strømtilførsel til udstyret.
2. Personer som skal i kontakt med udstyret skal være jordet eller bære anden form for elektrisk beskyttende udstyr. Manglende overholdelse af dette kan medføre skader på alle elektriske komponenter.
3. Alle elektriske komponenter skal opbevares eller transporteres i deres originale indpakning for at sikre komponenter mod statiske elektriske skader. Emballagen må ikke åbnes før komponenten skal installeres i udstyret. Ved afslutning af vedligeholdelse/reparation af udstyret, skal udstyret installeres med det samme eller pakkes forsvarligt hvis det skal på lager eller transporteres.

Bemærkninger:
Dette udstyr er ikke unik i den hensigt, at det indeholder for elektrostatisk afladning (ESD) sensitive reservedel. I de fleste elektronisk udstyr findes der metaloxyd teknologiske reservedel (NMOS, SMOS m.m.). Erfaringerne viser at selv den mindste statiske elektricitet kan skade, eller ødelægge disse instrumenter. Selv en fungerende elektrisk del kan have levetiden markant reduceret på grund af statisk elektricitet..

Dutch

Essentiële instructies
Lees ze voordat u verder gaat!

Brooks Instrument ontwerpt, produceert en test haar producten zodanig dat ze voldoen aan vele nationale en internationale normen. Deze producten moeten correct worden geïnstalleerd, bediend en onderhouden zodat ze binnen hun normale specificaties blijven werken. De volgende instructies moeten worden toegevoegd aan en geïntegreerd in uw veiligheidsprogramma als u producten van Brooks Instrument installeert, bedient en onderhoudt.

- Om de juiste prestaties te kunnen garanderen mag alleen gekwalificeerd personeel het product installeren, bedienen, updaten, programmeren en onderhouden.
- Lees alle instructies voordat u het product gaat installeren, bedienen en onderhouden. Als dit niet de juiste handleiding is, kijk dan op de achterzijde voor contactinformatie van uw vertegenwoordiger. Bewaar deze handleiding voor later.

WAARSCHUWING: gebruik dit instrument niet als niet is voldaan aan de specificaties in de handleiding. Het niet naleven van deze waarschuwing kan ernstig letsel en/of schade aan de apparatuur tot gevolg hebben.

- Als u één of meer instructies niet begrijpt, vraag dan om uitleg aan uw vertegenwoordiger van Brooks Instrument.
- Neem alle waarschuwingen, voorschriften en instructies in acht die op het product zijn aangebracht of bij het product zijn geleverd.
- Installeer uw apparatuur volgens de instructies in de bijgeleverde handleiding en in overeenstemming met de geldende lokale en nationale voorschriften. Sluit alle producten aan op de juiste elektrische voedings- en drukbronnen.
- Bediening: (1) Laat het systeem langzaam volstromen. Open de procesafsluiters langzaam om drukstoten te voorkomen. (2) Controleer op lekkages rondom de inlaat- en uitlaataansluitingen van de stromingsmeter. Als er geen lekkages zijn, kan het systeem op de bedrijfsdruk worden gebracht.
- Zorg ervoor dat de procesleiding drukvrij is gemaakt voordat u servicewerkzaamheden gaat uitvoeren. Als vervangingsonderdelen nodig zijn, zorg er dan voor dat gekwalificeerd personeel de door Brooks Instrument gespecificeerde vervangingsonderdelen gebruikt. Niet goedgekeurde onderdelen en procedures kunnen de prestaties van het product en de veilige werking van uw proces in gevaar brengen. Niet goedgekeurde vervangingsonderdelen kunnen brand, elektrische schokken of een onjuiste werking tot gevolg hebben.
- Zorg ervoor dat alle deksels van de apparatuur gesloten zijn en de afdekkingen gemonteerd zijn om elektrische schokken en lichamelijk letsel te voorkomen, behalve als gekwalificeerd personeel de onderhoudswerkzaamheden uitvoert.

WAARSCHUWING: bij vloeistofstroomapparaten waarvan de inlaat- en uitlaatkleppen om welke reden dan ook gesloten zijn, moet de vloeistof volledig worden afgetapt. Als dat wordt nagelaten, kan dit leiden tot thermische expansie van de vloeistof waardoor het apparaat kan barsten en lichamelijk letsel kan veroorzaken.

PED-richtlijn (Pressure Equipment Directive)

Alle drukapparatuur met een interne druk van meer dan 0,5 barg en een diameter van meer dan 25 mm valt onder de PED-richtlijn.

- In het hoofdstuk Specificaties van deze handleiding staan aanwijzingen die verband houden met de PED-richtlijn.
- De meters die in deze handleiding worden beschreven, voldoen aan de Europese richtlijn 97/23/EG.
- Alle stromingsmeters van Brooks Instrument vallen in groep 1.
- Meters met een diameter van meer dan 25 mm voldoen aan de categorieën I, II of III van de PED-richtlijn.
- Meters met een diameter van 25 mm of kleiner voldoen aan de regels van goed vakmanschap.

Elektromagnetische compatibiliteit (EMC)

De elektronische apparatuur van Brooks Instrument met de CE-markering is succesvol getest in overeenstemming met de EMC-voorschriften (richtlijn EMC 2004/108/EC).
De keuze van de signaalkabel voor gebruik in combinatie met apparatuur met CE-markering verdient speciale aandacht.
Kwaliteit van de signaalkabel, kabelafdichtingen en stekkers:
Brooks Instrument levert hoogwaardige kabels die voldoen aan de specificaties voor de CE-markering.
Als u zelf voor signaalkabel zorgt, moet u altijd een volledig afgeschermde kabel gebruiken.
Stekkers van het type “D” of ronde stekkers moeten zijn voorzien van een metalen afscherming. Indien nodig moeten metalen kabelafdichtingen worden gebruikt waarvan de afscherming voor het klemmen van de kabel kan worden gebruikt.
Het kabelscherm moet met het metalen omhulsel of de metalen afdichting worden verbonden en aan beide uiteinden rondom volledig worden afgeschermd.
De afscherming moet aan de aardpotentiaal worden aangesloten.
Card Edge Connectors zijn standaard niet van metaal. De gebruikte kabels moeten volledig zijn afgeschermd om te voldoen aan de CE-markering.
De afscherming moet aan de aardpotentiaal worden aangesloten.
Voor de pinconfiguratie: Raadpleeg de bijgevoegde handleiding.

Elektrostatische ontlading

VOORZICHTIG: Dit instrument bevat elektronische componenten die gevoelig zijn voor statische elektriciteit. Neem de juiste procedures in acht bij het verwijderen en installeren of bij andere werkzaamheden aan de interne printplaten of apparaten.
Procedure:

1. Schakel de voeding van de eenheid uit.
2. Het personeel moet zich met een polsbandje of ander veilig en geschikt hulpmiddel aarden voordat een printplaat of ander intern apparaat mag worden geïnstalleerd, verwijderd of aangepast.
3. Printplaten moeten in een geleidende verpakking worden vervoerd. De platen mogen pas vlak voor de eigenlijke installatie uit de beschermende verpakking worden gehaald. Verwijderde printplaten moeten onmiddellijk in de beschermende verpakking worden geplaatst om te worden getransporteerd, opgeslagen of teruggestuurd naar de fabriek.

Opmerkingen
Dit instrument is niet uniek als het gaat om componenten die gevoelig zijn voor elektrostatische ontlading. De meeste moderne elektronische apparaten bevatten componenten die gebruik maken van de metaaloxidetechnologie (NMOS, SMOS, enz.). Uit ervaring blijkt dat zelfs kleine hoeveelheden statische elektriciteit deze apparaten al dan niet onherstelbaar kunnen beschadigen. Beschadigde componenten, zelfs als ze goed lijken te functioneren, raken eerder defect.

Estonian

Olulised juhised
Enne kasutamist lugege hoolikalt läbi!

Brooks Instrument konstrueerib, valmistab ja katsetab oma tooteid selliselt, et need vastaksid paljude erinevate riiklike ja rahvusvaheliste standardite nõuetele. Ainult nõuetekohane paigaldamine, kasutamine ja hooldamine tagab toodete katkematu talitluse tavaspetsifikatsiooni raames. Brooks Instrument'i toodete paigaldamisel, kasutamisel ja hooldamisel tuleb täita alljärgnevaid juhiseid ja integreerida need asjakohasesse ohutusprogrammi.

- Nõuetekohase talitluse tagamiseks tohib toodet paigaldada, kasutada, täiustada, programmeerida ja hooldada ainult kvalifitseeritud personal.
- Enne toote paigaldamist, kasutamist ja hooldamist lugege kõik kasutusjuhised hoolikalt läbi. Kui käesolev kasutusjuhend ei vasta teie tootele, pöörduge kohaliku edasimüüja poole, kelle kontaktandmed leiate kasutusjuhendi tagakaanelt. Hoidke see kasutusjuhend edaspidiseks alles.
  ⚠ HOIATUS: ärge kasutage seda instrumenti väljaspool kasutusjuhendis spetsifitseeritud piirväärtusi. Selle hoiatuse eiramine võib põhjustada tõsiseid kehavigastusi ja/või kahjustada seadet.
- Kui te saa mõne juhise mõttest aru, pöörduge selgituste saamiseks kohaliku Brooks Instrument'i edasimüüja poole.
- Järgige kõiki hoiatusi, tähelepanule manitsusi ja juhiseid, mis on tootele peale kantud või tootega kaasa antud.
- Seadme paigaldamisel järgige vastavas kasutusjuhendis toodud paigaldusjuhiseid ning asjakohaseid kohalikke ja riiklikke eeskirju. Ühendage tooted nõuetekohaste toite- ja surveallikatega.
- Talitlus: (1) Avage aeglaselt vool süsteemi. Vooluimpulsside vältimiseks avage tööventiilid aeglaselt. (2) Kontrollige, et voolukulumõõturi sisend- või väljundühenduste ümber ei ole lekkeid. Kui lekkeid ei ole, laske süsteemil saavutada töösurve.
- Enne seadme hooldamist veenduge, et kogu süsteem on surve alt vabastatud. Varuosasid tohib vahetada ainult kvalifitseeritud personal, kasutades selleks Brooks Instrument'i poolt heakskiidetud varuosi. Mitteoriginaalvaruosade kasutamine ja ebapädev toimingute tegemine võivad kahjustada toote tööomadusi ja põhjustada riski tootmistegevuse ohutuse tagamisel. Originaalvaruosadele sarnaste osade kasutamine võib põhjustada tule- või elektrilöögiohtu või seadme väärtalitlust.
- Elektrilöögi- ja vigastuseohu vältimiseks peavad seadme luugid olema alati suletud ja kaitsekatted oma kohal, va seadme hooldamisel kvalifitseeritud isikute poolt.
  ⚠ HOIATUS: voolava vedelikuga seadmete kasutamisel – kui seadmega külgnevad sisend- ja väljundklapid on vaja mingil põhjusel sulgeda, tuleb seadmed vedelikust täiesti tühjaks lasta. Vastasel korral võib vedelik soojuse mõjul paisuda niivõrd, et seade puruneb. See võib põhjustada tõsiseid kehavigastusi.

Euroopa surveseadmete direktiiv (PED)

Euroopa surveseadmete direktiiv kohaldub kõikidele surveseadmetele, mille sisesurve on üle 0,5 baari (g) ja läbimõõt üle 25 mm või 1 tolli.

- Käesoleva kasutusjuhendi spetsifikatsiooniosa sisaldab surveseadmete direktiiviga seonduvaid juhiseid.
- Käesolevas kasutusjuhendis kirjeldatud mõõturid vastavad EN direktiivi 97/23/EÜ nõuetele.
- Brooks Instrument'i voolukulumõõturid kuuluvad vedelike 1. gruppi.
- Mõõturid läbimõõduga üle 25 mm või 1 tolli vastavad surveseadmete direktiivi kategooriale I, II või III.
- Mõõturitele läbimõõduga alla 25 mm või 1 tolli kohaldatakse häid inseneritavasid.

Euroopa elektromagnetilise ühilduvuse direktiiv (EMÜ)

Brooks Instrument'i (elektrilised/elektroonilised) seadmed, millele on omistatud CE-tähis, on edukalt läbinud asjakohased katsed ja vastavad elektromagnetilise ühilduvuse nõuetele (EMÜ direktiiv 2004/108/EC).
Kuid signaalkaabli valimisel on vaja pöörata suurt tähelepanu CE-tähisega seadmetele.
Signaalkaabli, läbiviigutihendite ja konnektorite kvaliteet
Brooks Instrument turustab kõrgekvaliteedilisi kaableid, mis vastavad CE-sertifikaadi nõuetele.
Olemasoleva kaabli kasutamisel jälgige, et kaabel oleks täielikult ümbritsetud varjestusega.
„D" või „Ring"-tüüpi konnektorid peavad olema varustatud metallvarjestusega. Kus kohaldatav, tuleb kasutada metallist läbiviike, mis tagavad kaabli varjestuse ühenduse.
Kaabli varjestus ühendatakse metallkesta või läbiviigutihendiga ja on mõlemast otsast kaitstud 360° ulatuses.
Varjestus peab olema maandatud.
Mikroskeemide servaühendused on üldjuhul mittemetallist. Vastavuse tagamiseks CE-sertifikaadi nõuetele peavad kasutatud kaablid olema 100% varjestatud.
Varjestus peab olema maandatud.
Klemmide konfigureerimine: vt komplekti kuuluvat kasutusjuhendit.

Elektrostaatiline laeng

⚠ TÄHELEPANU: seade sisaldab staatilise elektri suhtes tundlikke elektroonikakomponente. Seadmesse paigaldatud trükkplaatide eemaldamisel ja paigaldamisel, samuti trükkplaadi või seadmega muude toimingute teostamisel järgige nõuetekohase käsitsemise juhiseid.
Käsitsemisjuhised

1. Lahutage seade toiteallikast.
2. Enne trükkplaadi või mõne muu siseelemendi paigaldamist, eemaldamist või konfigureerimist peab personal olema maandatud läbi randmepaela või mõne muu sobiva vahendi.
3. Trükkplaate transporditakse voolujuhtivas konteineris. Võtke trükkplaat kaitsvast konteinerist välja vahetult enne selle paigaldamist. Seadmest eemaldatud trükkplaadid tuleb viivitamatult asetada kaitsvasse konteinerisse kas siis edasiseks transportimiseks, hoiustamiseks või tehasesse tagasisaatmiseks.

Kommentaarid
See seade ei ole ainus, mis sisaldab staatilise elektri suhtes tundlikke elemente. Enamik kaasaegsetest elektroonikaseadmetest sisaldavad komponente, mille valmistamiseks on kasutatud metalloksiidtehnoloogiat (NMOS, SMOS jne). Kogemused näitavad, et isegi väike kogus staatilist elektrit võib neid seadmeid kahjustada või isegi hävitada. Kuigi võib näida, et kahjustatud komponendid töötavad nõuetekohaselt, hakkavad talitlushäired ilmnema juba varakult.

Finnish

Perusohjeet
Lue ensin ohjeet huolellisesti!

Brooks Instrument suunnittelee, valmistaa ja testaa laitteensa vastaamaan useimpien kotimaisten ja kansainvälisten standardien vaatimuksia. Tuotteet tulee asentaa, käyttää ja huoltaa käyttöohjeiden mukaan jotta niiden toimivuus taataan. Brooks Instrumentin laitteiden asennuksessa, käytössä ja huollossa on noudatettava soveltuvia määräyksiä ja ohjeita, lisäksi mainitut ohjeet on huomioitava työsuojelun ohjeistuksessa.

Oikean toiminnan varmistamiseksi vain valtuutettu huoltohenkilö saa asentaa, käynnistää, päivittää, ohjelmoida ja huoltaa laitteita.
Lue kaikki käyttöohjeet koskien tuotteen asennusta, käyttöä ja huoltoa. Jos käyttöohje on puutteellinen, lisätietoja saa paikalliselta jälleenmyyjältä. Yhteystiedot löytyvät oppaan kansilehdestä. Säilytä ohjeet.

⚠ **VAROITUS!: Käyttöohjeessa ilmoitettujen standardien mukaisia ohjeita ja raja-arvoja ei saa ylittää. Rajoitusten laiminlyönti voi aiheuttaa tuotteen rikkoutumisen ja/tai vakavan henkilövahingon vaaran.**

- Jos ohjeissa on epäselvyyttä, ota yhteyttä Brooks Instrumentin edustajaan ongelman selvittämiseksi.
- Noudata kaikkia laitteessa olevia tai siihen liittyviä ohjeita, määräyksia ja varoituksia.
- Laittteen asennuksessa on noudatettava erityisiä asennusohjeita sekä voimassa olevia paikallisia ja kansainvälisiä määräyksiä. Laitteet saa yhdistää vain soveltuvaan sähkö- ja paineverkkoon.
- Asennusohjeita: (1) Päästä virtaus hitaasti järjestelmään. Avaa venttiilit hitaasti, jotta virtaus pysyy tasaisena. (2) Tarkista, ettei virtausmittarin sisään- ja ulosmenon vieressä ole vuotoa. Jos järjestelmässä ei ole vuotoa, aseta oikea käyttöpaine.
- Tarkista, että laitteeseen menevä paine on katkaistu ennen laitteen korjaamista välttääksesi äkillisen painepäästön aiheuttaman loukkaantumisriskin. Mahdollisten varaosien tulee olla Brooks Instrumentin hyväksymiä. Vain valtuutettu huoltohenkilö saa asentaa varaosat. Ei-hyväksyttyjen varaosien käyttö voi vahingoittaa tuotteen toimintaa ja aiheuttaa turvallisuusriskin. Samoin ei-hyväksyttyjen varaosien käyttö voi aiheuttaa tulipalon, sähköiskun tai virhetoiminnan riskin.
- Varmista että kaikki kaikki laitteen ovet/luukut ovat suljettuina ja tarkista että suojakannet ovat paikoillaan estääksesi mahdollisen sähköisku- ja loukkaantumisvaaran.

⚠ **VAROITUS!: Jos järjestelmässä virtaa neste ja laitteen sisään- ja ulosmenoventtiilit pitää sulkea, laite on ensin tyhjennettävä kokonaan. Tyhjentämisen laiminlyönti aiheuttaa nesteen lämpölaajenemista, joka saattaa johtaa laitteen rikkoutumiseen ja henkilövahingon vaaraan.**

Eurooppalainen painelaitedirektiivi (PED)

Painelaitteet, joidenpaine on suurempi kuin 0,5 bar ja joiden koko on suurempi kuin 25 mm tai 1 tuuma , kuuluvat eurooppalaiseen painelaitedirektiiviin (PED).

- PED direktiiviä koskevat määräykset löytyvät käyttöoppaan ''Tekniset tiedot" -luvusta.
- Käyttöoppaassa kuvatut mittarit ovat 97/23/EC EU-direktiivin mukaisia.
- Kaikki Brooks Instrumentin virtausmittarit kuuluvat virtausryhmään 1. Laitteet jotka ovat suurempia, kuin 25 mm tai 1 tuuma, ovat PED I, II, III kategorien mukaisia.
- Mittarit joiden koko on alle 25 mm tai 1 tuuma ovat hyvän konepajakäytännön (SEP) mukaisia.

Eurooppalainen direktiivi sähkömagneettisesta yhteensopivuudesta (EMC)

Brooks Instrumentin CE-merkin saaneet (sähkö/sähköiset) laitteet täyttävät EMC direktiivin vaatimukset ja testit sähkömagneettisesta yhteensopivuudesta (2004/108/EC EMC direktiivi).
Erityistä huomioita on kiinnitettävä CE-merkittyjen laitteiden käytössä olevien kaapelien valintaan.

Kaapelien, kiinnikkeiden ja liittimien laatu:

Brooks Insturmentin kaapelit ovat korkealaatuisia ja täyttävät CE-merkintä direktiivin vaatimukset.
Muun valmistajan kaapelia käytettäessä on käytettävä 100% suojattua kaapelia.
Liittimien tulee olla häiriösuojattua tyyppiä. Tarvittaessa käytetään metallisia kiinnikkeitä kaapelin suojuksen kiinnittämiseen. Kaapelin suojakuoren pitää olla yhdistettynä metallisuojukseen tai laippaan ja sen pitää olla molemmista päistä suojattuna 360^{o}. Suojaus päättyy maadoitukseen.
Standardin mukaan korttien liittimet eivät ole metallisia. Käytettyjen kaapelien suojaus on oltava 100%, jotta se täyttäisi CE-merkinnän direktiivin vaatimukset.
Suojaus päättyy maadoitukseen.
Napojen järjestys: Katso liitteenä oleva käyttöopas.

Elektrostaattinen purkaus (ESD)

⚠ **VAROITUS!: Tuote sisältää elektroniikkakomponentteja jotka voivat vahingoittua staattisesta sähköstä. Sisäisten piirilevyjen purkamisessa,asennuksessa ja käsittelyssä tulee noudattaa kaikkia määräyksiä ja ohjeita.**

Asennusohjeet:

1. Järjestelmän sähköt katkaistaan.
2. Laitteen kanssa työskentelevä henkilö on suojattava sähköiskuilta rannehihnalla tai muulla suojavarustuksella ennen piirilevyn tai muun sisäosan asennusta, poistamista tai korjaamista.
3. Piirilevyt kuljetetaan konduktiivisessa pakkauksessa. Piirilevyt puretaan paketista juuri ennen asennusta. Poistettu piirilevy on heti pakattava soveltuvaan suojapakkaukseen kuljettamista, varastoimista tai palautusta varten.

Huomautukset:

Tuotteen herkkyys elektrostaattiselle purkaukselle (ESD) ei ole epätavallista. Suurin osa elektroniikkatuotteista sisältää komponentteja jotka hyödyntävät metallioksiditekniikkaa (NMOS, SMOS jne.) Kokemusten mukaan pienikin elektrostaattinen purkaus voi aiheuttaa laitteiden virhetoiminnan tai vahingoittumisen. Vahingoittuneet komponentit saattavat aiheuttaa laitteen ennenaikaisen rikkoutumisen vaikka laite näyttäisi toimivan normaalisti.

French

Instructions essentielles
A lire avant de commencer !

Brooks Instrument conçoit, fabrique et teste ses produits pour répondre à de nombreuses normes nationales et internationales. Ces produits doivent être correctement installés, utilisés et entretenus pour pouvoir fonctionner dans le cadre de leurs spécifications normales. Les instructions qui suivent doivent être respectées et intégrées à votre programme de sécurité lors de l'installation, l'utilisation et l'entretien des produits Brooks Instrument.

- Afin d'assurer un fonctionnement correct, faites appel à du personnel qualifié pour l'installation, l'utilisation, la mise à jour, la programmation et l'entretien du produit.
- Lisez toutes les instructions avant l'installation, l'utilisation et l'entretien du produit. Si le présent manuel d'utilisation n'est pas le bon, consultez la dernière page de la couverture pour connaître le point de vente le plus proche. Conservez ce manuel d'utilisation pour pouvoir vous y reporter par la suite.

AVERTISSEMENT : n'utilisez pas cet instrument au-delà des spécifications énumérées dans le manuel d'utilisation.
Le non-respect de cet avertissement peut entraîner de graves blessures et / ou endommager l'équipement.

- Si vous ne comprenez pas l'une des instructions, prenez contact avec un représentant de Brooks Instrument pour obtenir des explications.
- Tenez compte de tous les avertissements, précautions et instructions marquées sur le produit et fournies avec celui-ci.
- Installez votre équipement de la façon indiquée dans les instructions d'installation du manuel d'utilisation et conformément à la législation en vigueur au niveau local et national. Branchez tous les produits aux sources d'électricité et de pression agréées.
- Utilisation : (1) Faites lentement entrer le débit dans le système. Ouvrez progressivement les vannes de procédé pour éviter des pics de débits. (2) Vérifiez qu'il n'y a pas de fuite au niveau des branchements d'entrée et de sortie du débitmètre. S'il n'y a pas de fuite, amenez le système à sa pression d'utilisation.
- Avant de procéder à l'entretien, assurez-vous que la conduite de procédé n'est plus sous pression. Lorsqu'il faut remplacer une pièce, assurez-vous que les pièces de rechange sont celles indiquées par Brooks Instrument et que des personnes qualifiées effectuent le remplacement. Les pièces et procédures non autorisées peuvent porter atteinte au fonctionnement du produit et mettre en péril la sécurité de votre procédé. Les remplacements par des pièces d'apparence similaire peuvent entraîner des incendies, des risques électriques ou un mauvais fonctionnement.
- Vérifiez que toutes les trappes de l'équipement sont fermées et que les couvercles de protection sont en place pour éviter les chocs électriques et les blessures, sauf lorsque l'entretien est réalisé par des personnes qualifiées.

AVERTISSEMENT : dans le cas d'appareils à écoulement liquide, si les vannes d'entrée et de sortie adjacentes aux appareils doivent être fermées pour une raison quelconque, les appareils doivent être complètement vidangés. Si cela n'est pas fait, une éventuelle dilatation thermique du fluide peut casser l'appareil et provoquer des blessures.

Directive européenne « équipements sous pression » (PED)

Tous les équipements sous pression dont la pression interne est supérieure à 0,5 bar (pression relative) et dont la taille dépasse 25 mm ou un pouce entrent dans le cadre de la directive PED.

- La section « Spécifications » de ce manuel contient les instructions relatives à la directive PED.
- Les appareils de mesure de ce manuel sont conformes à la directive EN 97/23/EC.
- Tous les débitmètres Brooks Instrument fonctionnent avec des fluides de groupe 1.
- Les appareils de mesure d'une taille supérieure à 25 mm ou un pouce entrent dans la catégorie PED I, II ou III.
- Les appareils de mesure d'une taille inférieure ou égale à 25 mm ou un pouce relèvent des « bonnes pratiques d'ingénierie » (SEP).

Compatibilité électromagnétique européenne (CEM)

L'équipement Brooks Instrument (électrique / électronique) portant le marquage CE répond à la réglementation en matière de compatibilité électromagnétique (directive CEM 2004/108/EC).
Il faut cependant prêter une grande attention au choix du câble d'interconnexion à utiliser avec l'équipement marqué CE.
Qualité du câble d'interconnexion, des presse-étoupes et connecteurs :
Brooks Instrument fournit un ou des câbles de qualité supérieure qui répondent aux spécifications exigées pour la certification CE.
Si vous utilisez votre propre câble d'interconnexion, ce câble doit être protégé par un blindage intégral.
Les connecteurs rectangulaires ou circulaires utilisés doivent avoir un blindage métallique. S'il y a lieu, des presse-étoupes métalliques doivent faire office de serre-écran de câble.
L'écran du câble doit être raccordé à l'enveloppe métallique ou au presse-étoupe et blindé aux deux extrémités sur 360 degrés.
Le blindage doit s'achever sur une prise de terre.
Les connecteurs de carte standards sont non métalliques. Les câbles utilisés doivent être protégés par un blindage intégral pour se conformer à la certification CE.
Le blindage doit s'achever sur une prise de terre.
En ce qui concerne la configuration des broches, veuillez vous reporter au manuel d'utilisation joint.

ESD (décharge électrostatique)

ATTENTION : cet instrument contient des composants électroniques sensibles à l'électricité statique. Des procédures de manipulation adéquates doivent être respectées pendant le retrait, l'installation ou la manipulation des cartes de circuits imprimés ou des dispositifs internes.
Procédure de manipulation :
1. L'alimentation électrique de l'appareil doit être coupée.
2. Le personnel doit être mis à la terre, au moyen d'une bande de poignet ou d'un autre moyen sûr et adéquat, avant l'installation, le retrait ou le réglage de toutes les cartes de circuits imprimés ou autres dispositifs internes.
3. Les cartes de circuits imprimés doivent être transportées dans un récipient conducteur. Les cartes ne doivent enlevées de cette enveloppe protectrice qu'au dernier moment, juste avant l'installation. Les cartes retirées doivent être immédiatement placées dans un récipient de protection pour le transport, le stockage ou le retour à l'usine.

Observations
Brooks Instrument n'est pas le seul à proposer des produits comportant des composants sensibles aux décharges électrostatiques. La plupart des produits électroniques modernes contiennent des composants qui utilisent des technologies à oxydes métalliques (NMOS, SMOS, etc.). L'expérience démontre que d'infimes quantités d'électricité statique suffisent à endommager ou détruire ces appareils. Les composants endommagés, même s'ils semblent fonctionner correctement, tombent rapidement en panne.

German

Wichtige Anweisungen
Bitte zuerst lesen!

Brooks Instrument entwickelt, produziert und testet seine Produkte derart, dass sie viele nationale und internationale Standards erfüllen. Nur bei korrektem Einbau sowie richtiger Bedienung und Wartung dieser Produkte ist ein Betrieb unter Einhaltung der Standardvorgaben sichergestellt. Die folgenden Anweisungen müssen eingehalten werden und in Ihr Sicherheitsprogramm integriert werden, wenn Sie Brooks Produkte installieren, bedienen und warten.

- Um die entsprechende Leistung zu gewährleisten, setzen Sie qualifiziertes Personal für die Installation, den Betrieb, die Aktualisierung, Programmierung und Wartung des Produkts ein.
- Lesen Sie alle Anweisungen, bevor Sie das Produkt installieren, in Betrieb nehmen und warten. Falls es sich bei diesem Handbuch nicht um das richtige Handbuch handelt, schauen Sie bitte auf der Rückseite nach den Kontaktdaten Ihres Vertriebsbüros vor Ort. Bewahren Sie dieses Handbuch auf, falls Sie später etwas nachschauen möchten.

WARNUNG: Dieses Gerät nicht außerhalb der in Bedienungsanleitung und Handbuch angegebenen Grenzen betreiben. Wird diese Warnung nicht beachtet, kann dies zu schweren Personenschäden bzw. Schäden des Gerätes führen.

- Falls Sie Anweisungen nicht verstehen, wenden Sie sich zur Klärung an Ihren Brooks Instrument Vertreter.
- Befolgen Sie alle Warnhinweise und Anweisungen, die auf dem Produkt markiert sind oder zusammen mit diesem geliefert werden.
- Installieren Sie Ihr Gerät, wie in den Installationsanweisungen des entsprechenden Handbuchs angegeben und gemäß der gültigen regionalen und nationalen Gesetze. Schließen Sie alle Produkte an eine geeignete Strom- und Druckluftversorgung an.
- Bedienung: (1) Langsam den Zufluss zum System starten. Die Ventile langsam öffnen, um einen sprunghaften Anstieg der Durchflussmenge zu verhindern. (2) Bereich der Anschlüsse (Zufluss und Ausfluss) des Durchflussmessers auf Undichtigkeiten überprüfen. Wenn das System dicht ist, auf Betriebsdruck hochfahren.
- Sicherstellen, dass der Leitungsdruck vor Wartungsarbeiten heruntergefahren wird. Wenn Ersatzteile benötigt werden, stellen Sie sicher, dass qualifizierte Personen Ersatzteile verwenden, die von Brooks Instrument vorgegeben sind. Nicht genehmigte Teile und Verfahren können die Leistungsfähigkeit des Produkts beeinträchtigen und den sicheren Betrieb Ihres Prozesses gefährden. Ähnlich aussehende Austauschteile können zu Bränden, elektrischen Gefahren oder nicht sachgerechtem Betrieb führen.
- Stellen Sie sicher, dass alle Türen der Anlage geschlossen sind und dass alle Schutzabdeckungen angebracht sind, um Stromschläge und Personenschäden zu vermeiden, es sei denn die Wartungsaufgaben werden von qualifizierten Personen durchgeführt.

WARNUNG: Werden die Ein- und Auslassventile neben Durchflussmessgeräten aus irgendwelchen Gründen geschlossen, so müssen die Geräte komplett entleert werden.
Durchflussmessgeraete muessen vor dem Schliessen von Ein- und Auslassventilen komplett entleert werden, anderenfalls kann es zu einer thermischen Ausdehnung der Flüssigkeit und damit zum Bruch des Gerätes kommen; Personenschäden können die Folge sein.

Europäische Druckgeräterichtlinie (PED)

Alle Druckgeräte mit einem internen Druck von mehr als 0,5 bar (g) und einer Größe von mehr als 1in (1 in = 25,4 mm) unterliegen der Druckgeräterichtlinie.

- Das Kapitel zu den technischen Daten in dieser Anleitung enthält wichtige Sicherheits- und Betriebsanweisungen in Bezug auf die Druckgeräterichtlinie.
- Messgeräte, die in diesem Handbuch beschrieben sind, erfüllen die europäische Richtlinie 97/23/EG.
- Alle Durchflussmesser von Brooks Instrument fallen unter die Fluidgruppe 1.
- Messgeräte, die größer als 25 mm oder 1“ (inch) sind, erfüllen die Kategorien I, II oder III der Druckgeräterichtlinie (PED).
- Messgeräte mit einer Größe von 25 mm oder 1“ (inch) oder kleiner sind Sound Engineering Practice (SEP).

Europäische Verordnung zur elektromagnetischen Verträglichkeit (EMV)

Geräte von Brooks Instrument (elektrischer und elektronischer Art) mit CE-Zeichen haben den Test auf Einhaltung der Verordnung zur elektromagnetischen Verträglichkeit (EMV Richtlinie 2004/108/EC) erfolgreich bestanden.
Dennoch muss bei der Wahl des Signalkabels für das Gerät mit CE-Zeichen auf folgende Dinge geachtet werden.
Qualität von Signalkabel, Kabeldurchführung und Anschlüsse:
Brooks Instrument liefert qualitativ hochwertige Kabel, die den Anforderungen für eine CE-Zertifizierung entsprechen.
Sollten Sie eigene Kabel einsetzen, so sollte das Kabel überall mit einer 100%-Abschirmung versehen sein.
D- oder Rundstecker sollten eine Metallabschirmung aufweisen. Wenn möglich, müssen Kabeldurchführungen aus Metall mit Kabelschirmgeflechts-Klemmen verwendet werden.
Der Kabelschirm sollte an die Metallhülle oder -durchführung angeschlossen werden und an beiden Enden rundherum (360 °) abgeschirmt werden.
Die Abschirmung sollte geerdet werden.
Randstecker auf Platinen sind standardmäßig nicht aus Metall. Die verwendeten Kabel müssen mit einer 100 % Abschirmung versehen werden, um die CE-Vorgaben zu erfüllen.
Die Abschirmung sollte geerdet werden.
Klemmenbelegung: Siehe beigefügtes Handbuch.

ESD (Elektrostatische Entladung)

ACHTUNG: Dieses Gerät enthält elektronische Komponenten, die durch elektrostatische Entladungen beschädigt werden können. Ordnungsgemäße Verfahrensanweisungen müssen während des Ausbaus, der Installation oder anderer Handhabung der eingebauten Platinen oder Geräte eingehalten werden.
Verfahrensanweisung:

1. Trennen Sie das Gerät von der Stromversorgung.
2. Das Personal ist vor dem Einbau, Ausbau oder der Einstellung von Platinen oder anderen internen Komponenten durch ein entsprechendes Armband mit dem Erdpotential zu verbinden.
3. Platinen sind in speziellen Behältern mit Schutz gegen elektrostatische Spannungen zu transportieren oder zu lagern. Platinen dürfen erst kurz vor dem Einbau aus der Schutzhülle entfernt werden. Ausgebaute Platinen müssen umgehend in Schutzbehälter zum Transport, zur Lagerung oder Rücksendung an das Werk gelegt werden.

Anmerkung
Dieses Gerät ist wie viele andere elektronische Geräte auch mit Komponenten bestückt, die anfällig für elektrostatische Entladung sind. Die meisten modernen, elektronischen Geräte enthalten Komponenten, die die Metalloxidtechnologie (NMOS, SMOS etc.) verwenden. Die Erfahrung hat gezeigt, dass schon geringe Mengen elektrostatischer Energie ausreichen, um diese Geräte zu beschädigen oder zu zerstören. Beschädigte Teile fallen früh aus, obwohl sie funktionsfähig zu sein scheinen.

Greek

Βασικές οδηγίες Διαβάστε πριν συνεχίσετε!

Η Brooks Instrument σχεδιάζει, παράγει και δοκιμάζει τα προϊόντα της σε συμμόρφωση με πλήθος εθνικών και διεθνών προτύπων. Η σωστή εγκατάσταση, χρήση και συντήρησή τους αποτελεί απαραίτητη προϋπόθεση της λειτουργίας εντός των κανονικών ορίων. Οι παρακάτω οδηγίες πρέπει να τηρούνται και πρέπει να ενσωματωθούν στο πρόγραμμα ασφάλειας της εργασίας σας κατά την εγκατάσταση, χρήση και συντήρηση προϊόντων της Brooks Instrument.

- Για σωστό αποτέλεσμα η εγκατάσταση, λειτουργία, ενημέρωση, προγραμματισμός και συντήρηση πρέπει να γίνεται από ειδικευμένο προσωπικό.
- Διαβάστε όλες τις οδηγίες πριν εγκαταστήσετε, λειτουργήσετε και συντηρήσετε το προϊόν. Εάν το παρόν εγχειρίδιο δεν είναι το σωστό εγχειρίδιο, συμβουλευθείτε το πίσω εξώφυλλο για τα στοιχεία επικοινωνίας του τοπικού αντιπροσώπου. Φυλάξτε το εγχειρίδιο αυτό για μελλοντική αναφορά.

⚠ ΠΡΟΕΙΔΟΠΟΙΗΣΗ: Μη λειτουργείτε τη συσκευή αυτή καθ' υπέρβαση των ορίων που αναγράφονται στο Εγχειρίδιο Οδηγιών και Λειτουργίας. Η μη συμμόρφωση με την προειδοποίηση αυτή μπορεί να οδηγήσει σε σοβαρό προσωπικό τραυματισμό ή/και ζημιά στον εξοπλισμό.

- Σε περίπτωση μη κατανόησης κάποιας από τις οδηγίες ζητήστε διευκρινίσεις από τον τοπικό αντιπρόσωπο της Brooks Instrument.
- Τηρείτε όλες τις προειδοποιήσεις, προφυλάξεις και οδηγίες που αναγράφονται ή συνοδεύουν το προϊόν.
- Εγκαταστήστε τη συσκευή όπως προβλέπεται στις οδηγίες εγκατάστασης του σωστού εγχειριδίου οδηγιών και στις κείμενες τοπικές και εθνικές διατάξεις. Συνδέστε τα προϊόντα στις εκάστοτε σωστές παροχές ρεύματος και πίεσης.
- Διαδικασία: (1) Αφήστε να ξεκινήσει αργά η ροή στο σύστημα. Ανοίξτε αργά τις βαλβίδες λειτουργίας για να αποφύγετε τις απότομες αυξομειώσεις ροής. (2) Ελέγξτε για διαρροές τις συνδέσεις εισόδου και εξόδου του ροόμετρου. Αν δεν υπάρχουν διαρροές, γεμίστε το σύστημα μέχρι η πίεση να φτάσει την κανονική πίεση εργασίας.
- Πριν από τη συντήρηση βεβαιωθείτε ότι γραμμή εργασίας έχει τεθεί εκτός πιέσεως. Σε περίπτωση αντικατάστασης ανταλλακτικών βεβαιωθείτε ότι το προσωπικό είναι ειδικευμένο και χρησιμοποιεί ανταλλακτικά που προβλέπει η Brooks Instrument. Μη εγκεκριμένα ανταλλακτικά και επεμβάσεις ενδέχεται να επηρεάσουν τις επιδόσεις του προϊόντος και να προκαλέσουν κίνδυνο για την ασφαλή λειτουργία. Αντικαταστάσεις με φαινομενικά όμοια ανταλλακτικά ενδέχεται να προκαλέσουν πυρκαγιά, κίνδυνο ηλεκτροπληξίας ή ανεπαρκή λειτουργία.
- Βεβαιωθείτε ότι όλα τα ανοίγματα του εξοπλισμού είναι κλειστά και τα προστατευτικά καλύμματα είναι στη θέση τους προκειμένου να αποφευχθεί ο κίνδυνος ηλεκτροπληξίας και προσωπικών τραυματισμών, εκτός εάν εκτελούνται εργασίες συντήρησης από ειδικευμένο προσωπικό.

⚠ ΠΡΟΕΙΔΟΠΟΙΗΣΗ: Προκειμένου για συσκευές με ροή ρευστού, όταν για οποιονδήποτε λόγο πρόκειται να κλείσουν οι βαλβίδες εισαγωγής και εξαγωγής κοντά στις συσκευές, οι συσκευές πρέπει να αποστραγγιστούν εντελώς. Η μη συμμόρφωση μπορεί να προκαλέσει θερμική διαστολή του υγρού που περιέχουν, με αποτέλεσμα να ραγίσει η συσκευή και να προκληθούν προσωπικοί τραυματισμοί.

Ευρωπαϊκή Οδηγία για τον εξοπλισμό υπό πίεση (PED)

Κάθε εξοπλισμός υπό πίεση με εσωτερική πίεση άνω του 0,5 bar (g) και μεγέθους μεγαλύτερου των 25 mm ή της 1 ίντσας εμπίπτει στις διατάξεις της ευρωπαϊκής Οδηγίας για τον εξοπλισμό υπό πίεση (PED).

- Το κεφάλαιο Προδιαγραφές του παρόντος εγχειριδίου περιλαμβάνει οδηγίες σχετικά με την Οδηγία PED.
- Οι μετρητές που περιγράφονται στο παρόν εγχειρίδιο συμμορφώνονται με την ευρωπαϊκή Οδηγία 97/23/ΕΚ.
- Όλα τα ροόμετρα της Brooks Instrument ανήκουν στην ομάδα ρευστών 1.
- Μετρητές μεγαλύτεροι από 25 mm ή 1 ίντσα συμμορφώνονται με τις κατηγορίες I, II και III της Οδηγίας PED.
- Μετρητές μεγέθους 25 mm ή 1 ίντσας ή και μικρότεροι κατασκευάζονται σύμφωνα με τους κανόνες της τέχνης (SEP).

Ευρωπαϊκή Οδηγία για την ηλεκτρομαγνητική συμβατότητα (EMC)

Ο (ηλεκτρικός/ηλεκτρονικός) εξοπλισμός της Brooks Instrument που φέρει το σήμα CE έχει υποστεί επιτυχώς τις δοκιμές που προβλέπουν οι διατάξεις της Οδηγίας για την ηλεκτρομαγνητική συμβατότητα (Οδηγία 2004/108/ΕC για την EMC).
Πάντως χρειάζεται ιδιαίτερη προσοχή στην επιλογή του καλωδίου σήματος για τον εξοπλισμό που φέρει το σήμα CE.
Ποιότητα των καλωδίων σήματος, στυπιοθλιπτών και βυσμάτων καλωδίων:
Η Brooks Instrument προσφέρει υψηλής ποιότητας καλώδια τα οποία πληρούν τις προδιαγραφές CE.
Σε περίπτωση παροχής δικού σας καλωδίου σήματος, χρησιμοποιείτε καλώδιο με πλήρη θωράκιση 100% σε όλα τα σημεία.
Βύσματα τύπου «D» ή κυκλικά πρέπει να έχουν μεταλλική θωράκιση. Να χρησιμοποιηθούν κατά προτίμηση μεταλλικοί στυπιοθλίπτες καλωδίων για τη στερέωση της θωράκισης.
Να συνδεθεί η θωράκιση του καλωδίου στο μεταλλικό κέλυφος ή στυπιοθλίπτη και να θωρακιστεί και στα δύο άκρα κατά 360 μοίρες. Η θωράκιση πρέπει να τερματίζει σε γείωση εδάφους.
Τα βύσματα άκρου της πλακέτας είναι εκ κατασκευής μη μεταλλικά. Τα χρησιμοποιούμενα καλώδια πρέπει να έχουν 100% θωράκιση για συμμόρφωση με την πιστοποίηση CE. Η θωράκιση πρέπει να τερματίζει σε γείωση εδάφους.
Για τη διάταξη των ακίδων: Συμβουλευθείτε το συνημμένο εγχειρίδιο οδηγιών.

Ηλεκτροστατική εκκένωση (ESD)

⚠ ΠΡΟΦΥΛΑΞΗ: Η συσκευή αυτή περιέχει ηλεκτρονικά εξαρτήματα τα οποία μπορούν να υποστούν εύκολα βλάβες από τον στατικό ηλεκτρισμό. Πρέπει να ακολουθούνται οι ορθές διαδικασίες χειρισμού κατά την αφαίρεση, τοποθέτηση ή άλλο χειρισμό των εσωτερικών πλακετών και διατάξεων.

Διαδικασία χειρισμού:

1. Θέστε τη συσκευή εκτός τάσεως.
2. Φροντίστε για τη γείωση του προσωπικού με περικάρπιο ή άλλο ασφαλές και κατάλληλο μέσο πριν τοποθετήσετε, αφαιρέσετε ή ρυθμίσετε κάρτες τυπωμένων κυκλωμάτων ή άλλη εσωτερική διάταξη.
3. Οι κάρτες τυπωμένων κυκλωμάτων πρέπει να μεταφέρονται σε συσκευασία από αγώγιμο υλικό. Οι κάρτες δεν πρέπει να αφαιρεθούν από το προστατευτικό περίβλημα παρά μόνο αμέσως πριν από την τοποθέτηση. Οι κάρτες που αφαιρέθηκαν πρέπει να τοποθετηθούν αμέσως σε προστατευτική συσκευασία για μεταφορά, αποθήκευση ή επιστροφή στο εργοστάσιο.

Παρατηρήσεις:
Η ύπαρξη εξαρτημάτων ευαίσθητων στα φαινόμενα ESD (ηλεκτροστατικής εκκένωσης) δεν είναι μοναδικό χαρακτηριστικό της συσκευής αυτής. Οι περισσότερες σύγχρονες ηλεκτρονικές συσκευές περιέχουν εξαρτήματα τεχνολογίας μεταλλικών οξειδίων (NMOS, SMOS κά.). Η πείρα έχει αποδείξει ότι μια μικρή ποσότητα στατικού ηλεκτρισμού αρκεί για να προκαλέσει βλάβες ή να καταστρέψει τις συσκευές αυτές. Εξαρτήματα που υπέστησαν βλάβη, ακόμη και αν μοιάζουν να λειτουργούν σωστά, κινδυνεύουν από πρώιμη αστοχία.

Hungarian

Alapvető utasítások Először olvassa el ezeket!

A Brooks Instrument olyan módon tervezi, gyártja és teszteli termékeit, hogy azok megfeleljenek számos belföldi és nemzetközi szabványnak. Ezeket a berendezéseket megfelelően kell telepíteni, üzemeltetni és karbantartani ahhoz, hogy mindenképpen a normál működési tartományuknak megfelelően üzemelhessenek. Az alábbi utasításokat be kell tartani, és be kell építeni a munkavédelmi programba a Brooks Instrument termékeinek telepítése, üzemeltetése és karbantartása során.
A megfelelő teljesítmény garantálása érdekében kizárólag szakképzett személyzet végezze a termék telepítését, üzemeltetését, frissítését, programozását és karbantartását.
Valamennyi utasítást el kell olvasni a termék telepítése, üzemeltetése és szervizelése előtt. Amennyiben ez a kézikönyv nem a megfelelő kiadvány, a hátsó borítón keresse meg a helyi forgalmazót, és további tájékoztatásért lépjen kapcsolatba vele. Őrizze meg ezt a kézikönyvet későbbi tájékoztatásként.

⚠ **FIGYELEM: Ne működtesse a berendezést az üzemeltetési utasításban megadott üzemi tartományokon túl. Ennek megsértése súlyos személyi sérüléshez vagy a berendezés meghibásodásához vezethet.**

- Amennyiben a gépkönyv utasításai nem egyértelműek, lépjen kapcsolatba Brooks Instrument képviselőjével, hogy tisztázzák a problémát.
- Tartsa be a berendezésen feltüntetett vagy azzal együtt szállított összes figyelmeztetést, felhívást és utasítás.
- A megfelelő telepítési utasításban megadott utasítások valamint a hatályos helyi és nemzeti előírások szerint telepítse a berendezést. A termékeket kizárólag a megfelelő elektromos és nyomásellátó forrásra kösse.
- Menete: (1) Lassan helyezze nyomás alá a rendszert. Lassanként nyissa ki az üzemi szelepeket az áramlásingadozás elkerülése érdekében. (2) Ellenőrizze, nincs-e szivárgás az áramlásmérő be-, és kimeneti bekötéseinél. Ha nincs szivárgás, töltse fel a rendszert az üzemi nyomásra.
- Szervizelés előtt mindenképpen ellenőrizze, hogy az üzemi vezeték nincs-e nyomás alatt. Amennyiben cserealkatrészekre van szükség, mindenképpen szakképzett személynek kell kezelnie a Brooks Instrument által meghatározott cserealkatrészeket. A nem engedélyezett alkatrészek és tevékenységek befolyásolhatják a termék teljesítményét, illetve veszélyeztethetik a biztonságos üzemeltetést. A pusztán hasonló alkatrészekkel történő helyettesítés tüzet, áramütésveszélyt vagy elégtelen működést eredményezhet.
- A berendezés összes ajtaja mindenképpen legyen zárva, a védőburkolatok pedig legyenek a helyükön az áramütés és a személyi sérülések elkerülése érdekében, kivéve, ha szakképzett szakember végez rajta karbantartási munkákat.

⚠ **FIGYELEM: Folyadékot áramoltató berendezések esetében, ha bármilyen okból el kell zárni a berendezés melletti ki-, és belépő szelepeket, a berendezést teljesen le kell üríteni. Ennek elmulasztása a folyadék hőtágulását okozhatja, ami károsíthatja a berendezést, és személyi sérüléshez vezethet.**

Nyomástartó berendezésekre vonatkozó európai irányelv (PED)

Minden 0,5 bar-nál (g) magasabb belső nyomású és 25 mm-nél vagy 1 hüvelyknél nagyobb nyomástartó berendezés a nyomástartó berendezésekre vonatkozó európai irányelv (PED) hatálya alá tartozik.

- A gépkönyv „Műszaki adatok” fejezete tartalmaz a PED irányelvre vonatkozó utasításokat.
- A gépkönyvben megadott mérőeszközök megfelelnek a 97/23/EK EU irányelvnek.
- Minden Brooks átfolyásmérő az 1-es folyadékcsoportba tartozik.
- A 25 mm-nél vagy 1 hüvelyknél nagyobb mérőeszközök megfelelnek a PED I, II, vagy III kategóriának.
- A 25 mm-es illetve 1 hüvelykes vagy kisebb mérőeszközök az elfogadott mérnöki gyakorlatot (SEP) követik.

Elektromágneses kompatibilitásra vonatkozó európai irányelv (EMC)

A Brooks Instrument CE jelölést kiérdemelt (elektromos/elektronikus) berendezései sikeresen teljesítették az elektromágneses kompatibilitási követelményeket (2004/108/EC sz. EMC irányelv) vizsgáló teszteket.
Ugyanakkor különös figyelmet kell fordítani a CE jelölésű berendezésekhez felhasznált jelkábelek kiválasztására.

A jelkábelek, kábelösszekötők, csatlakozók minősége:

A Brooks Insturment magas minőségű kábeleket kínál, melyek megfelelnek a CE minősítés követelményeinek.
Amennyiben saját jelkábelt alkalmaznak, olyat kell választani, amely 100%-os árnyékolással, teljes mértékben szűrt.
A „D” vagy „kör alakú” csatlakozóknak fémárnyékolóval árnyékoltnak kell lennie. Szükség esetén fém kábelösszekötőket kell alkalmazni a kábelszűrő rögzítésére.
A kábelszűrőt a fém házhoz vagy hüvelyhez kell csatlakoztatni és mindkét felén 360°-ban le kell árnyékolni. Az árnyékolásnak földelésben kell végződnie.
A kártyákhoz tartozó csatlakozók szabványosan nem fémesek. Az alkalmazott kábeleknek 100%-és árnyékolással szűrteknek kell lenniük, hogy megfeleljenek a CE minősítésnek.
Az árnyékolásnak földelésben kell végződnie.
Érintkező konfiguráció: Lásd a mellékelt kezelési utasítást.

Elektrosztatikus kisülés (ESD)

⚠ **VIGYÁZAT: A készülék olyan alkatrészeket tartalmaz, melyek hajlamosak a sztatikus elektromosság okozta károsodásra. Be kell tartani a megfelelő eljárásokat a belső áramköri kártyák és eszközök eltávolítása, behelyezése vagy egyéb kezelése során.**

Kezelési eljárás:

1. A berendezést áramtalanítani kell.
2. A személyt földelni kell csuklópánttal vagy egyéb biztonságos és a célra alkalmas eszközzel, mielőtt áramköri kártyát vagy egyéb belső eszközt telepítene, venne ki, vagy állítana be.
3. A nyomtatott áramköri kártyákat vezetőképes csomagolásban kell szállítani. A kártyák kizárólag közvetlenül a behelyezés előtt vehetők ki a védőburkolatból. A kiszerelt kártyát haladéktalanul el kell helyezni a mozgatásra, raktározásra vagy a gyári visszaszállításra szolgáló védőcsomagolásba.

Megjegyzések:

Nem egyedi jelenség, hogy a készülékben elektrosztatikus kisülésre (ESD) érzékeny alkatrészek találhatók. A legtöbb korszerű elektronikus eszközben fémoxid technológiás alkatrészek (NMOS, SMOS stb.) találhatók. A tapasztalatok azt igazolják, hogy még kis mértékű sztatikus elektromosság is károsíthatja, vagy tönkreteheti ezeket az eszközöket. A károsodott alkatrészek, még ha látszólag megfelelően működnek is, kezdődő hibára utalnak.

Italian

Istruzioni fondamentali
Leggerle subito!

La Brooks Instrument progetta, fabbrica e collauda i propri prodotti in maniera tale che siano conformi ai vari standard nazionali ed internazionali. Tali apparecchiature devono essere installate, messe in esercizio e tenute in manutenzione in maniera adeguata affinché operino in conformità alle loro normali specifiche di funzionamento. Le seguenti istruzioni devono essere rispettate ed inserite nel programma di tutela sul lavoro durante l'installazione, il funzionamento e la manutenzione dei prodotti Brooks Instrument.

- Per garantire un adeguato rendimento l'installazione, il funzionamento, l'aggiornamento, la programmazione e la manutenzione del prodotto devono essere eseguiti esclusivamente da personale specializzato.
- Leggere tutte le istruzioni prima dell'installazione, utilizzo e manutenzione del prodotto. Se questo manuale non è quello relativo al Vostro prodotto, cercare sul retro della copertina il distributore locale e contattarlo per ulteriori informazioni. Conservare il presente manuale per future consultazioni.

⚠ ATTENZIONE: Non utilizzare questo strumento in condizioni che eccedono le specifiche riportate nel Manuale d'Uso. L'inosservanza può causare gravi lesioni alle persone e/o danni all'apparecchiatura.

- Qualora le istruzioni del manuale non siano chiare, contattare un rappresentante della Brooks Instrument per chiarire il problema.
- Rispettare tutti gli avvisi, le istruzioni e gli avvertimenti riportati sull'apparecchiatura o forniti insieme ad essa.
- Installare l'apparecchiatura in base alle istruzioni riportate nel Manuale d'Uso e alle prescrizioni locali e nazionali in vigore. Collegare i prodotti esclusivamente ad un'adeguata sorgente di pressione ed alimentazione elettrica.
- Procedimento: (1) mettere lentamente sotto pressione il sistema. Aprire lentamente le valvole di servizio per evitare l'oscillazione del flusso. (2) Controllare che non ci siano perdite nei punti di connessione in entrata e in uscita del misuratore di flusso. Se non ci sono perdite, caricare il sistema alla pressione d'esercizio.
- Prima di effettuare manutenzione controllare che la linea di processo non sia sotto pressione. Se avete bisogno di pezzi di ricambio, il personale specializzato deve usare i pezzi di ricambio definiti dalla Brooks Instrument. Attività e pezzi di ricambio non autorizzati possono influire sul rendimento del prodotto e comprometterne il funzionamento in sicurezza. La sostituzione con pezzi di ricambio non originali può causare incendi, pericolo di scosse elettriche o funzionamento improprio.
- Tutti gli sportelli dell'impianto devono essere chiusi, le cappe di protezione devono essere al loro posto per evitare scosse elettriche e lesioni personali, tranne quando il personale specializzato esegue lavori di manutenzione.

⚠ ATTENZIONE: In caso di apparecchiature in cui scorre un liquido, se per qualsiasi motivo bisogna chiudere le valvole d'entrata e d'uscita accanto all'apparecchiatura, allora si deve svuotare completamente l'apparecchiatura. L'inosservanza può causare la dilatazione termica del liquido che può danneggiare l'apparecchiatura e provocare lesioni alle persone.

Direttiva europea relativa alle apparecchiature a pressione (PED)

Ogni apparecchiatura a pressione con pressione interna maggiore di 0,5 bar (g) e più grande di 25 mm o di 1 pollice ricade nell'ambito della Direttiva Europea relativa alle apparecchiature a pressione (PED).

- Il capitolo „Dati tecnici" del manuale contiene le disposizioni relative alla direttiva PED.
- Gli strumenti di misura descritti nel presente manuale sono conformi alla Direttiva UE 97/23/CE.
- Ogni flussimetro Brooks appartiene al gruppo di fluidi 1.
- Gli strumenti di misura maggiori di 25 mm o di 1 pollice sono conformi alla categoria I, II o III della PED.
- Gli strumenti di misurazione minori di 25 mm o di 1 pollice rientrano nella categoria SEP (Sound Engineering Practice).

Direttiva europea relativa alla compatibilità elettromagnetica (EMC)

Le apparecchiature (elettriche/elettroniche) Brooks Instrument dispongono del marchio CE ed hanno superato positivamente i test per i requisiti di compatibilità elettromagnetica (Direttiva EMC 2004/108/EC).
In ogni caso bisogna prestare particolare attenzione alla scelta dei cavi di segnale utilizzati per le apparecchiature con marchio CE.
Qualità dei cavi di segnale, dei pressacavi e dei connettori:
La Brooks Instrument offre cavi d'alta qualità conformi ai requisiti della certificazione CE.
Qualora vengano utilizzati cavi di segnale propri, devono essere scelti con schermatura al 100% e interamente filtrati.
I connettori „D" o „rotondi" devono essere schermati con schermatura metallica. In caso di necessità bisogna utilizzare pressacavi metallici di collegamento per fissare la schermatura del cavo.
La schermatura del cavo deve far contatto col guscio metallico o col pressacavo; il cavo deve essere schermato su entrambi i lati a 360°. La schermatura deve essere effettuata con messa a terra.
I connettori Card Edge normalmente non sono di metallo. I cavi utilizzati devono essere filtrati con schermatura al 100% per essere conformi alla marcatura CE.
La schermatura deve essere effettuata con messa a terra.
Configurazione pin: Vedi Manuale d'uso allegato.

Scarica elettrostatica (ESD)

⚠ ATTENZIONE: Il dispositivo contiene componenti elettronici che possono essere danneggiati da elettricità statica. Bisogna rispettare le adeguate procedure durante la rimozione, l'installazione o altra manovra delle schede del circuito elettrico interno.
Procedura di manovra:

1. Togliere alimentazione elettrica all'apparecchiatura.
2. La persona deve essere collegata a terra con una cerniera o con altri strumenti di sicurezza e adeguati allo scopo prima di installare, togliere o impostare la scheda del circuito elettrico o altri dispositivi interni.
3. Le schede del circuito stampato devono essere spedite in contenitori conduttivi. Le schede devono essere tolte dal rivestimento protettivo esclusivamente prima dell'installazione. Le schede confezionate devono essere collocate immediatamente nell'imballaggio protettivo per la movimentazione, l'immagazzinamento o resa alla fabbrica.

Note:
È un fenomeno comune che nei dispositivi di questo tipo si trovino componenti sensibili alla scarica elettrostatica (ESD). Nella maggior parte degli strumenti elettronici moderni si trovano componenti tecnologici metallo-ossido (NMOS, SMOS, ecc.). Le esperienze dimostrano che l'elettrostaticità anche in piccola misura può danneggiare o rovinare gli strumenti. I componenti danneggiati, anche se all'apparenza funzionano correttamente, potrebbero manifestare il difetto rapidamente.

Latvian

Svarīga instrukcija
Pirms turpināt izlasiet!

„Brooks Instrument" projektē, ražo un pārbauda savus ražojumus atbilstoši daudziem nacionālajiem un starptautiskajiem standartiem. Lai nodrošinātu šo izstrādājumu turpmāku darbību atbilstoši noteiktajiem parametriem, tie ir pareizi jāuzstāda, jālieto un jāapkopj. Uzstādot, lietojot „Brooks Instrument" izstrādājumus un veicot to apkopi, ir jāievēro šie norādījumi un jāiekļauj tie jūsu drošības programmā.

- Lai nodrošinātu pienācīgu izstrādājuma sniegumu, izstrādājuma uzstādīšanu, lietošanu, atjaunināšanu, programmēšanu un apkopi uzticiet veikt tikai kvalificētam personālam.
- Pirms izstrādājuma uzstādīšanas, lietošanas un apkalpošanas izlasiet visus norādījumus. Ja šī instrukciju rokasgrāmata nav pareizā, izstrādājumam atbilstošā rokasgrāmata, lūdzu skat. aizmugurējo vāku, kur ir sniegta vietējā tirdzniecības biroja kontaktinformācija.
  ⚠ **BRĪDINĀJUMS! Nelietot instrumentu ārpus Instrukciju un lietošanas rokasgrāmatā norādītajiem parametriem. Šī brīdinājuma neievērošanas rezultātā var rasties traumas un / vai aprīkojuma bojājumi.**
- Ja jūs nesaprotat kādu no instrukcijām, sazinieties ar „Brooks Instrument" pārstāvi un lūdziet izskaidrot to.
- Ievērojiet visus brīdinājumus, piesardzības mērus un instrukcijas, kas norādīti uz izstrādājuma vai piegādāti kopā ar to.
- Uzstādiet aprīkojumu tā, kā tas norādīts attiecīgajā instrukciju rokasgrāmatā iekļautajā uzstādīšanas instrukcijā un atbilstoši piemērojamajām vietējām un nacionālajām normām. Pievienojiet visus izstrādājumus pareiziem elektriskajiem un spiediena avotiem.
- Lietošana: (1) Lēnām uzsāciet plūsmu sistēmā. Lai izvairītos no straujiem plūsmas kāpumiem, lēnām atveriet procesa vārstus. (2) Pārbaudiet, vai nav noplūdes ap plūsmas mērītāja ieplūdes un izplūdes savienojumiem. Ja noplūdes nav, uzstādiet sistēmā darba spiedienu.
- Pārliecinieties par to, lai pirms instrumenta tehniskās apkopes būtu likvidēts procesa līnijas spiediens. Ja ir nepieciešams veikt kādu daļu nomaiņu, nodrošiniet, lai tiktu izmantotas „Brooks Instrument" norādītās daļas un daļu nomaiņu veiktu kvalificēts personāls. Neatļautu daļu un procedūru izmantošana var ietekmēs ražojuma sniegumu un samazināt procesa drošību. Līdzīgu, bet ne identisku daļu nomaiņas lietošana var izraisīt ugunsgrēka, elektrisko traucējumu riskus un nepareizu izstrādājuma darbību.
- Nodrošiniet, lai būtu aizvērtas visas durvis un būtu pareizi uzstādīti visi aizsargpārsegumi, tādējādi novēršot elektrošoka un traumu risku. Izņēmums ir gadījumi, kad kvalificēts personāls veic ražojuma apkopi.
  ⚠ **BRĪDINĀJUMS! Ja šķidrās plūsmas ierīču tuvumā esošos ieplūdes un izplūdes vārstus kāda iemesla dēļ ir jāaizver, no ierīcēm ir jāizlaiž viss šķidrums. Pretējā gadījumā šķidrums var termiski izplesties, pārraut ierīci un radīt traumas.**

Eiropas spiedieniekārtu direktīva (PED)

Uz visām spiedieniekārtām, kuru iekšējais spriegums pārsniedz 0,5 bar (g) un ir lielākas par 25 mm jeb 1" (collu), attiecas Eiropas spiedieniekārtu direktīva (PED).

- Šīs rokasgrāmatas tehnisko parametru nodaļā ir sniegtas a PED Direktīvu saistītās instrukcijas.
- Šajā rokasgrāmatā aprakstītie mērītāji atbilst EN Direktīvas 97/23/EK prasībām.
- Visi „Brooks Instrument" plūsmas mērītāji ietilpst 1. šķidrumu grupā.
- Uz 25 mm jeb 1" (collu) maziem un mazākiem mērītājiem attiecas labas inženierijas prakse (SEP).
- 25 mm jeb 1" (collu) mazi vai mazāki mērītāji atbilst PED kategorijai I, II vai III.

Eiropas elektromagnētiskās savietojamības direktīva (EMS)

Brooks Instrument" (elektriskās / elektroniskās) iekārtas ar CE zīmi ir izturējušas pārbaudi un atzītas par atbilstošām Eiropas elektromagnētiskās savietojamības direktīvas (EMS) prasībām (EMS 2004/108/EC)

Tomēr, izvēloties signālkabeli, kas tiks lietots kopā ar CE marķējuma iekārtu, ir jāievēro īpaša uzmanība**Signālkabeļa, kabeļa blīvslēgu un savienotāju kvalitāte:**

„Brooks Instrument" piegādā augstas kvalitātes kabeļus, kas atbilst CE sertifikācijas tehniskajiem parametriem.
Ja jūs lietojat pats savu signālkabeli, tam ir jābūt pilnībā, 100% ekranizētam.
„D" un „apaļā" tipa savienotājiem ir jābūt aprīkotiem ar metāla ekranizējumu. Ja nepieciešams, ir jāizmanto metāla blīvslēgi ar kabeļa ekranizējuma skavojumu. Kabeļa ekranizējumam ir jābūt savienotam ar metāla apvalku un abās pusēs aizsargātam 360 grādu diapazonā.
Ekranizējumam ir jābeidzas pie iezemējuma.
„Card Edge" savienotāji standarta izpildījumā ir nemetāla. Kabeļiem ir jābūt pārklātiem ar 100% ekranizējumu, lai tie atbilstu CE sertifikācijas prasībām. Ekranizējumam ir jābeidzas pie iezemējuma.
Attiecībā uz tapu konfigurāciju: skat. pievienoto instrukciju rokasgrāmatu.

ESD (elektrostatiskā izlāde)

⚠ **IEVĒROT PIESARDZĪBU! Šis instruments satur elektriskos komponentus, kas ir jutīgi pret statisko elektrību. Izņemot un uzstādot iekšējās ķēdes plates un ierīces vai kā citādi darbojoties ar tām, ir jāievēro noteikta darba kārtība.**

Darba kārtība:

1. Iekārta jāatslēdz no barošanas.
2. Pirms jebkādas drukātas shēmas kartes vai citas iekšējās ierīces uzstādīšanas, izņemšanas vai regulēšanas personālam, kas veiks šos darbus, ir jābūt iezemētam, piem., izmantojot aproces vai citus drošus, piemērotus līdzekļus.
3. Drukātās shēmas kartes ir jātransportē vadošā iepakojumā. Plāksnes no aizsargkorpusa drīkst izņemt tikai tieši pirms uzstādīšanas. Transportējot, uzglabājot vai atgriežot rūpnīcā no izņemtās plāksnes ir nekavējoties jāievieto aizsargiepakojumā.

Komentāri

Instruments nav unikāls tajā aspektā, ka tas satur pret ESD (elektrostatisko izlādi) jutīgus komponentus. Vairums mūsdienu elektroiekārtu satur komponentus, kuru ražošanā izmantota metāla oksīdu tehnoloģijas (NMOS, SMOS u.c.). Pieredze rāda, ka pat neliels daudzums statiskās elektrības var nodarīt bojājumus šādām ierīcēm vai pilnībā sabojāt tās. Bojātie komponenti pat tad, ja tie šķietami darbojas pareizi, ir pakļauti ātrākai atteicei.

Lithuanian

Pagrindinės instrukcijos
Perskaitykite prieš tęsdami!

„Brooks Instrument“ projektuoja, gamina ir išbando savo gaminius, kad jie atitiktų įvairius nacionalinius ir tarptautinius standartus. Šie gaminiai turi būti tinkamai montuojami, eksploatuojami ir prižiūrimi, kad ir toliau veiktų pagal jiems būdingus techninius parametrus. Toliau pateiktų nurodymų reikia laikytis ir įtraukti juos į saugos programą montuojant, eksploatuojant ir prižiūrint „Brooks Instrument“ produktus.

- Siekiant užtikrinti tinkamą veikimą, montuoti, eksploatuoti, naujinti, programuoti ir prižiūrėti gaminį turi tik kvalifikuoti darbuotojai.
- Perskaitykite visus nurodymus prieš montuodami, eksploatuodami ir prižiūrėdami gaminį. Jei gavote netinkamą instrukciją, galiniame jos viršelyje žiūrėkite vietinės prekybos atstovybės kontaktinę informaciją. Išsaugokite šią instrukciją pasižiūrėjimui ateityje.

⚠ **ĮSPĖJIMAS: nenaudokite šio prietaiso viršydami instrukcijoje ir eksploatacijos vadove nurodytus techninius duomenis. Nesilaikydami šio įspėjimo galite sunkiai susižeisti ir (arba) sugadinti įrangą.**

- Jei nesuprantate kokių nors nurodymų, kreipkitės į „Brooks Instrument“ atstovą, kad paaiškintų.
- Paisykite visų įspėjimo, perspėjimų ir nurodymų, pažymėtų ant gaminio arba pateiktų su juo.
- Įrangą montuokite taip, kaip nurodyta atitinkamos instrukcijos montavimo nurodymuose arba taikomuose vietiniuose ar nacionaliniuose kodeksuose. Visus gaminius junkite prie tinkamų elektros ir slėgio šaltinių.
- Eksploatacija: (1) lėtai įjunkite srautą į sistemą. Lėtai atidarykite proceso vožtuvus, kad išvengtumėte srauto antplūdžių. (2) Patikrinkite, ar nėra nuotėkių aplink srauto matuoklio įleidimo ir išleidimo jungtis. Jei nuotėkių nėra, sukurkite sistemoje darbinį slėgį.
- Prieš atlikdami priežiūros darbus būtinai pašalinkite slėgį proceso linijoje. Jei reikia pakeisti dalis, užtikrinkite, kad kvalifikuoti darbuotojai naudotų „Brooks Instrument“ nurodytas pakaitines dalis. Netinkamos dalys ir procedūros gali pakenkti gaminio veikimui ir kelti pavojų saugiai jūsų proceso eksploatacijai. Tik panašiai atrodantys pakaitalai gali sąlygoti gaisrą, elektros pavojus ar netinkamą veikimą.
- Užtikrinkite, kad visos įrangos durelės būtų uždarytos, o apsauginiai dangčiai uždėti, kad išvengtumėte elektros smūgio ir sužeidimų, išskyrus kai kvalifikuoti darbuotojai atlieka priežiūros darbus.

⚠ **ĮSPĖJIMAS: naudojant skysto srauto įrenginius, jei dėl kokios nors priežasties prireikia uždaryti šalia įrenginio esančius įleidimo ir išleidimo vožtuvus, iš įrenginio reikia išleisti visą skystį. To nepadarius galimas šiluminis skysčio plėtimasis, galintis sugadinti įrenginį ir sužeisti žmonės.**

Europos slėginės įrangos direktyva (PED)

Visa slėginė įranga, kurios vidinis slėgis didesnis nei 0,5 bar (g), o dydis didesnis nei 25 mm arba 1 colis, yra reglamentuojama slėginės įrangos direktyvos (PED).

- Šios instrukcijos dalyje „Techniniai duomenys“ pateikiami nurodymai, susiję su PED direktyva.
- Šioje instrukcijoje aprašyti matuokliai atitinka Europos Sąjungos direktyvą 97/23/EB.
- Visi „Brooks Instrument“ srauto matuokliai priklauso 1 skysčių grupei.
- Didesni nei 25 mm arba 1 colis matuokliai atitinka PED I, II arba III kategoriją.
- 25 mm arba 1 colio ar mažesni matuokliai atitinka tinkamą inžinerijos praktiką (SEP).

Europoje taikomi elektromagnetinio suderinamumo (EMC) reikalavimai

CE ženklu pažymėta „Brooks Instrument“ (elektrinė / elektroninė) įranga buvo sėkmingai išbandyta pagal elektromagnetinio suderinamumo reikalavimus (EMC direktyvą 2004/108/EC).
Bet reikia ypatingo dėmesio renkantis signalizavimo kabelį, kuris bus naudojamas su CE ženklu pažymėta įranga.
Signalizavimo kabelio, kabelių riebokšlių ir jungčių kokybė:
„Brooks Instrument“ tiekia kokybiškus kabelius, kurie atitinka CE sertifikavimo specifikacijas.
Jei naudojate savo signalizavimo kabelį, jis turi būti visiškai ir visas ekranuotas 100 % ekranu.
Naudojamos „D“ arba „apskrito“ tipo jungtys turi būti ekranuotos metaliniu ekranu. Jei taikoma, reikia naudoti metalinius kabelių riebokšlius, užtikrinančius kabelio ekrano suspaudimą.
Kabelio ekraną reikia jungti prie metalinio apvalkalo ar riebokšlio ir ekranuoti abiejuose galuose 360 laipsnių.
Ekranas turi baigtis įžeminimu.
Standartinės kraštinės jungtys yra ne metalinės. Naudojami kabeliai turi būti ekranuoti 100 % ekranu, kad atitiktų CE sertifikavimą. Ekranas turi baigtis įžeminimu.
Keturių kontaktų konfigūracija: žr. pridėtą instrukciją.

ESD (elektrostatinis išlydis)

⚠ **PERSPĖJIMAS: šiame prietaise yra elektroninių komponentų, kuriuos gali sugadinti statinė elektra. Išimant ar įdedant vidines spausdintines plokštes ar įrenginius, arba atliekant su jomis kitus darbus, reikia laikytis tinkamų darbo procedūrų.**
Darbo procedūra:

1. Atjunkite įrenginio maitinimą.
2. Darbuotojai turi pasirūpinti įžeminimu naudodami riešo juostelę ar kitas saugias tinkamas priemones prieš įdėdami, išimdami ar reguliuodami bet kokią spausdintinės plokštės kortelę ar kitą vidinį komponentą.
3. Spausdintinės plokštės korteles reikia transportuoti laidžiame konteineryje. Neleidžiama išimti plokštės iš apsauginio dėklo, nebent prieš pat įdėjimą. Išimtas plokštes reikia nedelsiant įdėti į apsauginį konteinerį transportavimui ar saugojimui arba grąžinti į gamyklą.

Pastabos
Šis instrumentas nėra unikalus dėl jame esančių ESD (elektrostatiniam išlydžiui) jautrių komponentų. Daugelyje šiuolaikinių elektroninių gaminių yra komponentų, kuriuose naudojama metalo oksidų technologija (NMOS, SMOS ir pan.). Patirtis rodo, kad net ir mažas statinės elektros kiekis gali pakenkti tokiems gaminiams ar juos sugadinti. Sugadinti komponentai, net jei atrodo, kad jie veikia tinkamai, anksti nustoja veikti.

Polish

Zalecenia wstępne

Prosimy przeczytać przed rozpoczęciem użytkowania!

Brooks Instrument projektuje, wytwarza i testuje swoje produkty tak, aby spełniały wymagania licznych norm krajowych i międzynarodowych. Te produkty muszą być poprawnie instalowane, obsługiwane oraz konserwowane, aby zapewnić ich prawidłowe działanie zgodnie ze specyfikacją techniczną. Podczas instalowania, obsługiwania i konserwowania produktów firmy Brooks Instrument należy przestrzegać następujących zaleceń:

- Aby zapewnić właściwe działanie sprzętu, instalacja, obsługa, aktualizacje, programowanie i konserwacja powinny być wykonywane przez przeszkolony personel.
- Przed instalacją, obsługą i czynnościami serwisowymi należy zapoznać się ze wszystkimi zaleceniami producenta. Aby uzyskać instrukcję obsługi odpowiednią dla danego sprzętu należy skontaktować się z lokalnym przedstawicielem handlowym producenta. Instrukcję obsługi należy zachować do późniejszego użycia.

⚠ **OSTRZEŻENIE: Nie wolno przekraczać podanych w instrukcji zakresów działania urządzenia. Nieprzestrzeganie tego zalecenia może doprowadzić do poważnego zagrożenia życia lub zdrowia personelu i / lub uszkodzenia sprzętu.**

- Jeżeli jakieś zalecenia w instrukcji obsługi urządzenia są niezrozumiałe, prosimy o skontaktowanie się z przedstawicielem firmy Brooks Instrument, aby wyjaśnić problem.
- Należy postępować biorąc pod uwagę wszystkie ostrzeżenia, uwagi i zalecenia umieszczone na produkcie lub dołączone do niego.
- Instalację urządzenia należy przeprowadzić zgodnie z zaleceniami zawartymi w instrukcji instalacji oraz z obowiązującymi lokalnymi i narodowymi oznaczeniami. Wszystkie urządzenia można podłączać wyłącznie do odpowiednich źródeł energii elektrycznej oraz ciśnienia.
- Pierwsze czynności obsługowe: (1) Należy powoli włączyć przepływ w instalacji. Następnie powoli otworzyć zawory robocze tak, aby uniknąć wahań przepływu. (2) Należy teraz sprawdzić, czy nie występują nieszczelności przy podłączeniach wejściowym i wyjściowym miernika przepływu. Jeżeli nie ma żadnych nieszczelności, można zwiększyć ciśnienie w instalacji do wartości ciśnienia roboczego.
- Przed przystąpieniem do czynności serwisowych należy upewnić się, że ciśnienie robocze jest odłączone. Jeżeli konieczna jest wymiana części zamiennych, należy zawsze stosować części zamienne specyfikowane przez firmę Brooks Instrument a czynności ich wymiany powinien w każdym przypadku dokonywać przeszkolony personel. Stosowanie nieautoryzowanych części i procedur serwisowych może niekorzystnie wpłynąć na działanie produktu oraz zagrozić bezpieczeństwu instalacji. Korzystanie z podobnie wyglądających zamienników może doprowadzić do pożaru, porażenia prądem lub nieprawidłowego działania urządzenia.
- Należy upewnić się, że wszystkie otwory urządzenia są zamknięte a osłony umocowane na swoich miejscach, aby zapobiec obrażeniom ciała lub porażeniu prądem personelu. Zalecenie to nie dotyczy przeszkolonego pracownika wykonującego prace serwisowe lub konserwacyjne.

⚠ **OSTRZEŻENIE: W przypadku mierników przepływu cieczy, jeżeli znajdujące się na nich zawory wejściowe i wyjściowe mają być z jakiegoś powodu zamknięte, to urządzenie musi zostać całkowicie opróżnione z ciekłego medium. Niedopełnienie tego zalecenia może doprowadzić do termicznego zwiększenia objętości cieczy, co z kolei może spowodować uszkodzenie urządzenia i obrażenia personelu.**

Europejska dyrektywa dotycząca urządzeń ciśnieniowych (PED)

Wszystkie urządzenia ciśnieniowe pracujące przy ciśnieniu wewnętrznym względnym większym niż 0.5 bara i wielkości powyżej 25 mm lub 1 cala podlegają dyrektywie europejskiej dotyczącej urządzeń ciśnieniowych (PED).

- Rozdział „Specyfikacja techniczna" niniejszej instrukcji zawiera zalecenia dotyczące dyrektywy PED.
- Mierniki opisane w tej instrukcji są zgodne z dyrektywą EN 97/23/EC.
- Wszystkie mierniki przepływu firmy Brooks Instrument należą do 1-szej grupy cieczy.
- Urządzenia pomiarowe o wielkości powyżej 25 mm lub 1 cala należą do kategorii I, II lub III dyrektywy PED.
- Urządzenia pomiarowe o wielkości 25 mm lub 1 cala lub mniejsze podlegają zaleceniom „Uznanej Praktyki Inżynierskiej" (SEP).

Europejska dyrektywa dotycząca kompatybilności elektromagnetycznej (EMC)

Urządzenia elektryczne / elektroniczne firmy Brooks Instrument posiadające oznaczenie CE, przeszły pozytywnie testy pod kątem spełniania przez nich wymogów kompatybilności elektromagnetycznej (Dyrektywa EMC 2004/108/EC).
Jednakże szczególną uwagę należy poświęcić przy doborze przewodów sygnałowych, które mają być stosowane z urządzeniami ze znakiem CE.
Jakość przewodu sygnałowego, dławic oraz złączy przewodu:
Firma Brooks Instrument dostarcza wysokiej jakości przewody, które spełniają wymagania zawarte w specyfikacji dla certyfikatu CE.
Jeżeli stosuje się własne przewody sygnałowe, to powinny one być w całości w pełni ekranowane.
Złącza typu „D" lub okrągłe powinny zawierać metalowy ekran. Jeśli to możliwe, należy stosować metalowe dławice przewodu zapewniające mocowanie jego ekranu.
Ekran przewodu powinien być połączony z metalową osłoną lub dławicą zapewniając całkowite, dookólne ekranowanie na obu końcach przewodu.
Ekran przewodu powinien być uziemiony.
Złącza krawędziowe są standardowo niemetaliczne. Stosowane przewody muszą być w pełni ekranowane zgodnie z certyfikatem CE.
Ekran przewodu powinien być uziemiony.
Konfiguracja styków jest podana w niniejszej instrukcji obsługi.

Wyładowania elektrostatyczne (ESD)

⚠ **UWAGA: Urządzenie zawiera części elektroniczne podatne na uszkodzenia spowodowane ładunkami elektrostatycznymi. Przy obchodzeniu się z wewnętrznymi podzespołami i częściami elektronicznymi należy przestrzegać następujących zasad postępowania:**

1. Należy odłączyć zasilanie od urządzenia.
2. Osoba wykonująca czynności musi zostać uziemiona za pomocą opaski na przegubie dłoni lub w inny, bezpieczny sposób, zanim przystąpi do instalacji, wyjęcia lub regulacji obwodów drukowanych lub innych wewnętrznych podzespołów elektronicznych urządzenia.
3. Obwody drukowane należy transportować w przewodzącym pojemniku. Płytki drukowane należy wyjmować z opakowania ochronnego bezpośrednio przed ich montażem. Wymontowane płytki należy niezwłocznie umieścić w opakowaniu ochronnym służącym do transportowania, składowania lub odsyłania do producenta.

Uwagi:
Fakt, że urządzenie zawiera części nieodporne na wyładowania elektrostatyczne (ESD) jest rzeczą normalną. Większość nowoczesnych urządzeń elektronicznych zawiera komponenty wykonane w technologii tlenków metali (NMOS, SMOS itp.). Jak pokazuje praktyka, nawet niewielkie wyładowanie elektrostatyczne może uszkodzić lub zniszczyć takie urządzenie. Uszkodzone części, nawet jeżeli na pozór działają poprawnie, szybko doprowadzają do nieprawidłowej pracy urządzenia.

Portuguese

Instruções Básicas
Ler antes de proceder!

A Brooks Instrument projecta, fabrica e testa os seus produtos de forma a satisfazer numerosas normas nacionais e internacionais. Estes equipamentos devem ser instalados, utilizados e mantidos de forma adequada, e devem funcionar dentro da sua gama de utilização. As instruções seguintes devem ser, durante a instalação, uso e/ou manutenção dos equipamentos da Brooks Instrument, apreendidas e integradas no plano de protecção e segurança no trabalho.

- Para assegurar o desempenho adequado, a instalação, exploração, actualização e/ou manutenção do equipamento deve ser realizada, exclusivamente, por pessoal qualificado.
- Antes de instalar, utilizar e/ou executar operações de manutenção devem ser lidas todas as instruções do equipamento. No caso do presente manual não ser apropriado procure, na capa traseira, o distribuidor mais próximo e contacte-o para obter informações adicionais. Guarde este manual para futura referência.

⚠ **ATENÇÃO: não sujeite o equipamento a condições fora das gamas de serviços indicadas. Ao não respeitar esta advertência poderá provocar avarias no equipamento e/ou danos pessoais.**

- Se as instruções deste manual não estiverem suficientemente claras, contacte o representante Brooks Instrument para esclarecer as suas dúvidas.
- Tenha sempre presente todas as advertências, apelos e instruções indicadas no equipamento e/ou fornecidas junto com o mesmo.
- A instalação do equipamento deverá ser efectuada cumprindo todas as instruções indicadas no manual assim como as normas e regulamentos locais e nacionais vigentes. Ligue o equipamento exclusivamente a fontes de energia eléctrica e/ou pneumática adequadas.
- Procedimento: (1) Pressurize lentamente o sistema. Abra lentamente as válvulas para evitar variações bruscas de caudal. (2) Verifique se há fugas nas ligações de entrada e saída do medidor de caudal. Se não detectar fugas, poderá colocar o sistema à pressão de trabalho.
- Antes de efectuar qualquer operação de manutenção verifique sempre a possibilidade do equipamento estar sob pressão. No caso de ser preciso substituir peças, estas devem ser as recomendadas pela Brooks Instrument e o trabalho de substituição deverá ser efectuado por técnicos qualificados. Procedimentos e peças não conformes poderão alterar o desempenho do equipamento, danificá-lo ou colocar em risco a sua segurança ou de outros. Substituir peças por outras não originais, meramente semelhantes, poderá originar choques eléctricos, fogo ou em funcionamento inadequado.
- Deverá manter o equipamento intacto e fechado, verificando se as coberturas de protecção estão nos seus lugares devidos, de forma a evitar choques eléctricos e/ou danos pessoais, excepto no caso de se tratar de um técnico qualificado e se estiver a executar trabalhos de manutenção.

⚠ **ATENÇÃO: Se por qualquer razão for necessário fechar as válvulas a montante e jusante do equipamento, tenha em atenção que o mesmo deverá ser previamente esvaziado do fluído que o atravessa. Esta obrigação surge do facto de existir a possibilidade de ocorrer dilatação térmica do líquido, no interior do aparelho, podendo provocar danos pessoais ou materiais graves.**

Directiva Europeia para equipamentos sob pressão (PED)

Todos os equipamentos sujeitos a pressão interior superior a 0,5 bar (g) e com calibre superior a 25 mm (1 polegada) estão sob a vigência da directiva europeia de equipamentos sob pressão (PED).

- O capítulo "Dados técnicos" do manual contém instruções relativas à Directiva PED.
- O caudalímetro objecto deste manual satisfaz a directiva 97/23/CE da UE.
- Os caudalímetros Brooks pertencem ao grupo 1 de fluidos.
- Os caudalímetros com calibre superior a 25 mm (1 polegada) pertencem às categorias PED I, II, ou III.
- Os caudalímetros de 25 mm (1 polegada) ou menores seguem as “Boas regras de engenharia” (SEP).

Directiva Europeia sobre Compatibilidade electromagnética (EMC)

Os equipamentos (eléctricos/electrónicos) da Brooks Instrument que têm a marcação CE passaram os testes comprovativos dos requisitos de compatibilidade electromagnética (Directiva EMC número 2004/108/EC).
Todavia, ao utilizar os aparelhos compete-lhe a escolha dos cabos de sinal adequados para os equipamentos com marcação CE.

Qualidade dos cabos de sinal, bucins e conectores:

A Brooks Instrument fornece cabos de alta qualidade que cumprem todos os requisitos da marcação CE.
No caso de utilizar os seus próprios cabos de sinal, assegure uma blindagem a 100%.
Os conectores do tipo “D” ou "circular" têm que ser blindados por uma malha metálica. Se precisar de usar bucins, estes têm que permitir a crimpagem da malha/blindagem do cabo.
A blindagem do cabo deve ser ligada ao corpo metálico ou bocal e assegurando a blindagem em 360°. A blindagem deve terminar numa ligação à terra.
Os conectores ligados a cartões serão, em geral, não-metálicos. Os cabos utilizados devem ter fita de blindagem a 100% para satisfazer a marcação CE.
A blindagem, deverá terminar numa ligação à terra.
Atribuição de pinos: Veja as instruções de operação anexas.

Descarga Electrostática (ESD)

⚠ **ATENÇÃO: Alguns componentes deste equipamento são susceptíveis à acção da electricidade estática, podendo ficar danificados. Ao remover, colocar ou manipular placas de circuitos electrónicos deverá ter em atenção os seguintes procedimentos:**

1. Desligar o equipamento da rede.
2. O utilizador, antes de qualquer intervenção que envolva os cartões de circuitos ou outros dispositivos internos, terá que se ligar à terra por meio duma bracelete de pulso ou outro dispositivo adequado.
3. Os circuitos impressos deverão ser transportados numa embalagem condutiva. Os cartões só deverão ser retirados da embalagem protectora imediatamente antes da sua inserção. O cartão retirado deverá ser recolocado imediatamente na embalagem protectora que servirá para o seu transporte, armazenagem ou retorno a fábrica.

Observações:

Tenha presente que este equipamento poderá não ser o único objecto capaz de ser portador de peças sensíveis a descargas electrostáticas (ESD).
Na maioria dos dispositivos electrónicos Brooks encontram-se peças de tecnologia de óxidos metálicos (NMOS, SMOS, etc.). A experiência mostra que até pequenas quantidades de electricidade estática são capazes de danificar ou destruir esses dispositivos. Os componentes danificados, embora inicialmente funcionem aparentemente bem, acabam por ter falhas prematuramente.

Romanian

Indicații de referință

Citiți-le întâi pe acestea!

Brooks Instrument își proiectează, produce şi testează produsele într-un mod ce respectă un mare număr de standarde autohtone şi internaționale. Aceste instalații trebuie amplasate, exploatate şi întreținute corespunzător, pentru ca în toate situațiile, domeniul lor de lucru să corespundă operării normale. În ceea ce priveşte instalarea, operarea şi întreținerea produselor Brooks Instrument, indicațiile de mai jos trebuie respectate şi trebuie introduse in programul de protecția muncii.

- Pentru garantarea prestației corecte, instalarea, operarea, actualizarea, programarea şi întreținerea produsului poate fi realizată doar de către personal calificat.
- Instrucțiunile de instalare ale produsului trebuie citite integral, înainte de punerea în serviciu şi exploatarea sa. În măsura în care ediția acestui manual nu este cea adecvată, identificați pe ultima copertă coordonatele distribuitorului local şi pentru lămuriri suplimentare adresați-vă acestuia. Păstrați acest manual pentru referințe ulterioare.

⚠ ATENȚIE: Nu utilizați instalația în afara intervalului de funcționare indicat în instrucțiunile de operare. Nerespectarea acestui lucru se poate solda cu răniri grave de persoane sau defectarea instalației.

- În măsura în care indicațiile cărții maşinii nu sunt suficient de lămuritoare, luați legătura cu reprezentantul Brooks Instrument pentru clarificarea problemei.
- Păstrați toate avertismentele, avizele şi instrucțiunile livrate odată cu instalația sau inscripționate pe aceasta.
- Efectuați instalarea echipamentului în conformitate cu indicațiile de instalare corespunzătoare, respectiv cu respectarea prevederilor naționale. Echipamentul se conectează exclusiv la surse de energie electrică şi de presiune corespunzătoare.
- Succesiune: (1) Presurizați lent instalația. Deschideți încetul cu încetul supapa de funcționare pentru evitarea fluctuațiilor de flux. (2) Controlați dacă nu sunt prelingeri la intrarea sau ieşirea debitmetrului de branşare. Dacă nu sunt scurgeri, presurizați instalația la presiunea de lucru.
- Înaintea exploatării/ întreținerii, verificați neapărat dacă conducta uzinală nu este sub presiune. În măsura în care este nevoie de piese de schimb, este neapărat necesar ca manevrarea pieselor de schimb să fie făcută de personal cu calificare profesională agreat de Brooks Instrument. Utilizarea altor piese de schimb decât cele originale şi licențiate poate avea efecte asupra performanțelor instalației şi asupra siguranței sale în exploatare. Utilizarea de piese asemănătoare de substituire poate avea ca rezultat pericol de incendiu şi electrocutare.
- În toate cazurile toate uşile instalației trebuie să fie închise, cuştile de protecție să fie puse la locurile lor, pentru evitarea electrocutării şi rănirii de persoane, exceptând situațiile când un specialist efectuează lucrări de întreținere.

⚠ ATENȚIE: În cazul instalațiilor cu flux de fluide, dacă din orice motiv este necesară închiderea valvelor de intrare şi ieşire, limitrofe instalației, instalația trebuie complet golită. Neglijarea acestui lucru poate avea ca efect dilatarea termică a fluidului, care poate defecta instalația şi poate produce răniri de persoane.

Directiva europeană pentru instalațiile sub presiune (PED)

Toate instalațiile şi sistemele presurizate ce se află sub presiuni interne ce depăşesc 0,5 mbar (g) şi au mai mult de 25 mm sau 1 țol, cad sub incidența normei europene corespunzătoare (PED).

- La capitolul "Date tehnice" din cartea maşinii se găsesc indicațiile corespunzătoare directivei PED.
- Mijloacele de măsurare menționate în cartea maşinii corespund directivei 97/23/EK EU.
- Toate debitmetrele Brooks corespund clasei 1 de fluide.
- Mijloacele de măsurare mai mari de 25 mm sau 1 țol corespund categoriei PED I, II sau III.
- Mijloacele de măsurare mai mici de 25 mm sau 1 țol se conformează practicii inginereşti acceptate (SEP).

Directiva europeană privitoare la compatibilitatea electromagnetică (EMC).

Instalațiile (electrice /electronice) ce poartă marca Brooks Instrument CE îndeplinesc cu succes cerințele testelor de verificare ale compatibilității electromagnetice (Cf. directivelor europene EMC cu nr. 2004/108/EC).
În acelaşi timp trebuie acordată o atenție deosebită la alegerea cablurilor de semnalizare utilizate pentru instalațiile ce poartă marcajul CE.

Calitatea cablurilor de semnalizare, a legăturilor prin cablu şi a conectoarelor:

Brooks Instrument oferă cabluri de calitate ridicată, care corespund cerințelor calitative ale CE.
În măsura în care folosiți cabluri proprii, trebuie alese acelea care sunt 100% ecranate şi prevăzute cu filtre.
Conectoarele „D" sau cele „circulare" trebuie sa dispună de ecrane metalice. În caz de nevoie trebuie folosite conectoare metalice pentru montarea filtrelor de cablu.
Filtrul de cablu trebuie conectat la carcasa metalică sau manşon şi în ambele cazuri trebuie asigurată ecranarea la 360°. Ecranarea trebuie terminată cu o legare la pământ.
Conform standardului, conectoarele aparținând plăcilor electronice nu sunt metalice. Cablurile folosite trebuie să fie 100% ecranate şi prevăzute cu filtre pentru a corespunde clasificării CE.
Ecranarea trebuie terminată cu o legare la pământ.
Configurație de contact: Vezi instrucțiunile de operare ataşate.

Descărcare electrostatică (ESD)

⚠ ATENȚIE: Instalația include piese care sunt predispuse la defectare sub influența electricității statice. Trebuie respectate metodele corespunzătoare de extragere, instalare sau alte manipulări ale circuitelor electronice.

Procedură de manipulare:

1. Instalația trebuie scoasă de sub tensiune.
2. Înaintea de inserarea, scoaterea sau reglarea vreunei cartele electronice, sau a altui dispozitiv intern, persoana trebuie să se lege la pământ cu banda pentru articulația mâinii sau alte dispozitive de siguranță disponibile pentru acest scop.
3. Cartelele cu cablaje electronice imprimate trebuie transportate în ambalaje anti-electrostatice (conductoare). Cartelele se pot scoate din ambalaj, doar nemijlocit înaintea amplasării lor. Cartela demontată trebuie pusă neîntârziat în ambalajul de protecție în vederea transportării, a depozitării sau returnării la producător.

Observații:

În echipamente se găsesc adesea componente sensibile la descărcare electrostatică (ESD). Majoritatea echipamentelor moderne includ componente electronice realizate în tehnologie metal-oxid semiconductor (NMOS, SMOS, etc.) Experiența a dovedit că acestea pot fi afectate sau deteriorate chiar de energii electrostatice de slabă intensitate. Componentele defectate, cu toate că în aparență sunt funcționale, duc în timp la defecțiuni incipiente.

Slovak

Základné príkazy

Prečítať pred inštaláciou!

Brooks Instrument svoje výrobky projektuje, vyrába a testuje takým spôsobom, aby tieto vyhoveli domácim aj medzinárodným normám. Tieto zariadenia je potrebné predpísaným spôsobom inštalovať, prevádzkovať a udržiavať, na zabezpečenie ich spoľahlivej a normálnej prevádzky v celom pracovnom rozsahu. Nižšie uvedené príkazy je potrebné dodržiavať a začleniť do programu bezpečnostných predpisov v priebehu inštalácie, prevádzky a údržby výrobkov Brooks Instruments.

- V záujme zabezpečenia vyhovujúceho výkonu inštaláciu, prevádzku, programovanie, aktualizáciu a údržbu zariadení má vykonávať výlučne odborne kvalifikovaný personál.
- Pred inštaláciou, prevádzkou a servisu zariadení je potrebné prečítať všetky príkazy. Ak táto príručka nie je správna, tak na zadnej strane treba nájsť miestneho distribútora, kontaktovať ho pre ďalšie informácie. Pre neskoršie informácie uschovajte príručku.

⚠ UPOZORNENIE: Neprevádzkovať zariadenie v rozsahu mimo rozsahu uvedenom v prevádzkovej príručke. Porušenie tohto oznámenia môže mať za následok ťažkú ujmu na zdraví a vedie k poškodeniu zariadenia.

- Ak príkazy v návode nie sú jednoznačné, kontaktujte zástupcu Brooks Instrument na objasnenie problémov.
- Dodržujte všetky upozornenia, príkazy a usmernenia uvedené na zariadení, alebo s ním dodané.
- Zariadenia inštalujte podľa návodu uvedeného v príkaze na inštaláciu, v súlade s miestnymi a národnými predpismi. Zariadenie pripojte výlučne len na vyhovujúci elektrický a tlakový zdroj
- Postup: (1) Pomaly natlakujte systém. Prevádzkový ventil otvorte pomaly na zamedzenie kolísania prietoku. (2) Prekontrolujte tesnosť vstupného a výstupného zapojenia prietokomeru. Keď nie je presakovanie, spoje sú tesné, naplniť systém na prevádzkový tlak.
- Pred vykonávaním servisných prác kontrolovať, či systém nie je pod tlakom. V prípade, že je potrebná výmena súčiastky, výmenu dielov, určených Brooks Instrument musí vykonať kvalifikovaná osoba. Použitie nepovolených dielov a vykonávanie nepovolených aktivít ohrozujú bezpečnosť prevádzvky a majú negatívny vplyv na výkon zariadenia. Nahradenie súčiastok len podobnými komponentmi môže mať za následok požiar, úraz elektrickým prúdom alebo nedostatočnú funkciu zariadenia
- Všetky ochranné kryty, dvierka zariadenia majú byť zatvorené na zabezpečenie ochrany proti úrazu elektrickým prúdom a proti poraneniam obsluhy. Výnimku tvorí vykonávanie údržby kvalifikovaným odborníkom.

⚠ UPOZORNENIE: Pri zariadeniach s prietokom kvapalín, keď z akéhokoľvek dôvodu je nutné uzavrieť vstupné a výstupné ventily, zariadenie je potrebné úplne vyprázdniť. Zanedbanie vypúšťania má za následok poškodenie zariadenia s možnosťou zranenia obsluhy z dôvodu tepelnej rozťažnosti náplne.

Európska smernica vzťahujúca sa na tlakové zariadenia (PED)

- Všetky zariadenia s vyšším vnútorným pretlakom ako 0,5 bar (g), a väčšieho rozmeru ako 25 mm alebo 1 anglický palec, podliehajú pod Európsku smernicu vzťahujúcu sa na tlakové nádoby (PED).
- Kapitola "Technické údaje" návodu na obsluhu obsahuje príkazy vzťahujúce sa na smernicu PED.
- Meracie prostriedky uvedené v návode na obsluhu vyhovujú smernici 97/23/ES EÚ.
- Všetky prietokomery Brooks patria do 1. skupiny kvapalín.
- Meracie prístroje presahujúce rozmery 25 mm alebo 1 " spĺňajú I., II., alebo III. kategóriu PED.
- Meracie prístroje menšie alebo rovné ako 25 mm alebo 1 " zodpovedajú zaužívanej meracej praxi (SEP).

Európska smernica vzťahujúca sa na elektromagnetickú kompatibilitu (EMC)

Elektrické / elektronické zariadenia Brooks Instrument, ktoré si zaslúžili značku CE, úspešne splnili skúšobné testy požiadaviek elektromagnetickej kompatibility (smernica EMC č. 2004/108/EC).
Pritom treba venovať zvláštnu starostlivosť na výber signálnych káblov zariadenia, s označením CE.
Kvalita signálnych káblov, káblových spojov a prípojov:
Brooks Instrument ponúka vysoko kvalitné káble, ktoré spĺňajú požiadavky kvalitatívneho zaradenia CE.
Ak použijete vlastné signálne káble, majú mať 100%-né tienenie, s plným filtrovaním.
Prípojky "kruhové" alebo tvaru "D" majú mať kovové tienenie. V prípade potreby treba použiť kovové káblové spojky k upevneniu káblového filtra. Káblový filter treba pripojiť ku kovovému telesu alebo k puzdru, na oboch stranách zabezpečiť tienenie v kruhu 360 °. Tienenie má byť ukončené uzemnením.
Prípojky vedúce ku kartám podľa noriem sú nekovové. Použité káble, pre vyhovenie predpisom CE musia mať 100%-né filtrovanie tienením. Tienenie má byť ukončené uzemnením.
Konfigurácia kontaktov: Viď priložený návod na obsluhu. .

Elektrostatický výboj (ESD)

⚠ UPOZORNENIE: Prístroj obsahuje súčiastky, ktoré môžu byť poškodené od elektrostatických nábojov. Pri montáži, odstraňovaní alebo inej údržby vnútorných obvodových kariet je potrebné dodržiavať príslušné postupy.

Postup ošetrovania:

1. Zariadenie odpojiť od napájania.
2. Osoba vykonávajúca údržbu má byť uzemnená uzemňujúcim náramkom, alebo iným, na túto prácu vyhovujúcim spôsobom pred vykonávaním inštalácie, demontáže a nastavenia obvodových kariet alebo iného vnútorného prostriedku.
3. Karty obvodov sa musia prepravovať v elektricky vodivom balení. Karty sa môžu vyberať z ochranného obalu výlučne len tesne pred montážou, zasunutím! Vybranú kartu okamžite treba umiestniť do ochranného obalu, určeného pre dopravu, skladovanie, alebo pre spätnú prepravu do výrobného závodu.

Poznámky:
Existencia prvkov, ktoré sú citlivé na elektrostatické výboje (ESD) v prístroji je častým javom. U väčšiny moderných elektronických prostriedkov sú použité prvky s technológiou oxidu kovov (NMOS, SMOS, atď.). Skúsenosti dokazujú, že aj nepatrné elektrostatické výboje poškodzujú, zničia tieto prostriedky. Poškodené súčiastky, aj keď zdanlivo pracujú bez chyby, odkazujú na vznikajúce poruchy.

Slovene

Osnovna navodila

Najprej preberite jih

Brooks Instrument tako konstruira, izdeluje in terstira svoje izdelke, da oni ustrezajo številnim domačim in mednarodnim standardom. Te naprave se morajo ustrezno instalirati, koristiti in vzdrževati, da vsekakor delajo ustrezno normalnom področju funkcioniranja. Naslednjih navodil se mora držati in potrebno je vgraditi v program varstva pri delu pri instaliranju, koriščenju in vzdržavanju izdelkov proizvajalca Brooks Instrument.

- Za jemstvo ustreznega učinka naj izključno strokovno osobje opravlja instaliranje, koriščenje, osveženje, programiranje in vzdrževanje izdelka.
- Potrebno je prebrati vsa navodila pred instaliranjem, koriščenjem in servisiranjem izdelka. V kolikor ta priročnik ni ustrezna publikacija, na zadnji strani poiščite lokalnega distributerja in za nadaljnje informacije stopite z njim v kontakt. Prihranite ta priročnik za poznejše informacije.

⚠ OPOMBA: Ne koristite napravo izven področja iz navodila za uporabo. Prekršek tega lahko privede do osebnih poškodb ali okvare naprave.

- V kolikor navodila priročnika niso enosmiselna, stopite v kontakt z zastopnikom društva Brooks Instrument, da razčistite problem.
- Držite se vseh opozoril, povabil, navodil, ki so navedena na napravi ali skupaj z njim izporočena.
- Napravo instalirajte shodno navodilom in relevantnim lokalnim in nacionalnim navodilom iz navodila za instalirenje.. Izdelek spojite izključno na ustrezni izvir elektrike in obskrbo tlaka.
- Proces: (1) Počasi položite sistem pod tlak. Počasi odpirajte pogonske ventile zaradi izogibanja nihanju pretoka. (2) Preverjajte, ima li curljanja pri povezu vstopa in izstopa merilca toka. Če ni curljanja, naplonite sistem na pogonski tlak.
- Pred servisom vsekakor preverjajte, ali je pogonski vod pod tlakom. Če je potreben rezervni del, svekakor strokovna oseba mora rokovati z rezervnimi deli odrejenimi od Brooks Instrument. Nedovoljeni rezervni deli in dejavnosti lahko vplivajo na učinek izdelka, oziroma ugrožavajo varnostni pogon. Sprememba samo z podobnimi rezervnimi deli lahko ima za posledico požar, nevarnost električnega šoka ali nedovoljno funkcioniranje.
- Vsa vrata naprave svekakor morajo biti zaprta, zaščitni ovitki morajo biti na svojem mestu zaradi izogibanja šoku in osebnim poškodbam, razen, če na njej strokovnjak opravlja dela vzdrževanja.

⚠ OPOMBA: V primeru naprave za tok tekočine, če je iz katera koli razloga potrebno zapreti vstopne in izstopne ventile pri napravi, naprava se mora celotno izprazniti. Zamuda tega lahko provzroči toplotno proširjenje tekočine, kar poškoduje napravo in lahko povrzoči osebno poškodbo.

Europske smernice za naprave ohranjanja pritiska (PED)

Vsaka naprava ohranjanja pritiska z notranjim pritiskom več od 0,5 bara (g) in večjim od 25 mm ali 1 palca sodi pod Europskim smernicam za ohranjanje pritiska (PED).

- Poglavje priročnika „Tehnični podatki" vsebuje navodila, ki se nanašajo na smernice PED.
- Merilni instrumenti navajani v priročniku ustrezajo smernicam EU številke 97/23/EK
- Vsaki merilec pretoka Brooks sodi v skupino tekočin številke 1.
- Merilni instrumenti večji od 25 mm ali 1 palca ustrezajo kategriji PED I, II, ali III.
- Merilni instrumenti manjši od 25 mm oziroma 1 palca ali manjši sledijo sprejeti inženjeski praksi (SEP).

Evropska smernica za Elektromagnetno kompatibilnost (EMC)

Naprave Brooks Instrument, ki so zaslužile CE označbo (električni/elektronski) so uspešno izpolnile testove zahteve o elektromangnetni kompatibilnosti (št. 2004/108/EC smernice EMC) .
Obenem mora se posebno pozornost posvetiti na izbiro signalnega kabla, ki se uporabljajo za naprave z označbo CE.
Kakaovost signalnih kablov, povezav kablov, priključkov:
Brooks Insturment nuja kabele visoke kakovosti, ki ustrezajo zahtevam kvalificiranja CE.
V kolikor se uporbalja lastni signalni kabel, treba je izbrati, ki za 100 % senco v polni meri filtriran.
Priključki „D" „olika kroga" morajo biti zasenčeni kovonskom sencom. Če bo potrebno, uporabite kovinske povezave za pritrditev filtra kabla
Filtar kabla je treba priključiti na kovinsko ohišje ali plašt in na obe polovici je treba senčiti v 360°. Senčenje mora završiti v ozemljitvi.
Priključki, ki sodijo karitcam normalno nisu kovinskik. Koriščeni kabli moraju biti filtrirani s 100 % senco, da odgovarjajo CE kvalifikaciji.
Sencanje mora imat konec v ozemljitvi.
Konfiguracija stika: Vidi priloženo navodilo za uporabo.

Elektrostatično izpražnjenje (ESD)

⚠ OPOZORILO: Naprava vsebuje take sestavne dele, ki so naklonjeni k poškodbi od statične elektrike. Treba se je držati ustreznih postopkov pri odstranjevanju, vlogu ali drugega rokovanja kartic in sredstev notranjih tokovnih krogov.
Posotpek rokovanja:

1. napravo je treba izklopiti iz električnega toka.
2. Osebo je treba ozemljiti zapestnim paščekom ali z drugim varnostnim in za ta namen primernim sredstvom preden bi instalirala, jemala, ali nastavila kartico za tokovni krog ali drugo notranjo opremo.
3. Tiskane kartice tokovnega kroga je treba izporočiti v konduktivni embalaži. Karte so odstranjive izključno neposredno pred vlogom iz zaščitne embalaže ven. Izjemljeno kartico nemudoma staviti v zaščitno embalažo za gibanje, skladiščenje ali pošiljanje nazaj.

Opombe:
Nije poseben pojav, da se v napravi nahajajo občutljivi sestavni deli na elektrostatično pražnjenje (ESD). V većem delu modernih elektronskih sredstev nahajajo se sestavni deli na kovinsko oksidno tehnologijo (NMOS, SMOS itd..). Izkustva potrjujejo, da majhna statična elektrika more poškodovati ali uničiti ta sredstva. Oškodovani rezervni deli, če na videz dobro delajo, nakažejo začetno napako.

Spanish

Instrucciones básicas ¡Léalos primero!

El Brooks Instrument proyecta, fabrica y prueba sus productos de manera que éstos respondan a numerosas normas nacionales e internacionales. Dichas instalaciones deben ser emplazadas, operadas y mantenidas adecuadamente, para que puedan marchar de todas formas en conformidad con el alcance normal de funcionamiento. Las siguientes instrucciones deben cumplirse y incorporadas en su programa de seguridad cuando instalando, operando y mantenimiento los productos Brooks Instrument.

- Para asegurar el adecuado rendimiento, para instalar, operar, actualizar, programar y mantener tiene que realizarse exclusivamente por una persona calificada.
- Antes de la instalación, operación y servicio del producto leer todas las respectivas instrucciones. Si el presente manual no es la adecuada publicación, busque al distribuidor local que figura en la contraportada y póngase en contacto con él para obtener informaciones. Guarde el presente manual para tener informaciones también en el futuro.

⚠ **ATENCIÓN: No haga funcionar los equipos fuera del rango indicado en las instrucciones de funcionamiento. El incumplimiento de estas últimas puede conducir a graves daños personales o a la avería del equipo.**

- Si las instrucciones del manual no son evidentes, póngase en contacto con el representante de Brooks Instrument para aclarar el problema
- Observar todas las alertas, advertencias e instrucciones indicadas en el equipo o suministradas con el mismo.
- Instale su equipo en conformidad con las recomendaciones indicadas en las respectivas instrucciones de instalación y con las pautas de las normas vigentes locales e internacionales. Conectar el producto exclusivamente a la adecuada fuente eléctrica y presión.
- Proceso: (1) Colocar lentamente flujo en el sistema. Abrir lentamente las válvulas de proceso para evitar oscilación del flujo. (2) Verificar si hay fuga alrededor de las conexiones de entrada y salida del flujómetro, Si no hay, llenar el sistema con la presión de operación.
- Antes de efectuar el servicio, verificar si hay presión o no en la tubería de la red. Si se requiere realizar un recambio de piezas, solamente el personal calificado puede manipular las piezas de repuesto determinadas por Brooks Instrument Las piezas y operaciones no autorizadas pueden afectar el rendimiento del producto o arriesgar el funcionamiento seguro. El recambio realizado con piezas sólo similares pueden traer como consecuencias incendios, choques eléctricos o funcionamiento bajo.
- Todas las puertas de la instalación deben estar cerradas, las cubiertas de protección tienen que hallarse en el debido sitio con el fin de evitar los daños personales y los choques eléctricos, salvo cuando un especialista efectúa el mantenimiento.

⚠ **ADVERTENCIA: En caso de instalaciones que circulen líquido, si por cualquier razón se hubiera de cerrar las válvulas de entrada y salida situadas al lado del equipo, dichas instalaciones deberán ser completamente vaciadas. La omisión de esto último puede provocar la dilatación térmica del líquido, lo que puede dañar al equipo y conducir a daños personales.**

Directriz Europea de los Equipos de Presión (PED)

Todos los equipos de presión, con una presión interna que supere a 0,5 bar (g) con tamaño mayor a 25 mm o 1 pulgada entran el ámbito de la Directriz Europea de los Equipos de Presión (PED).

- El capítulo Datos Técnicos del manual incluye las instrucciones respecto a las directivas de PED
- Los instrumentos de medición indicados en el Manual responden a las EN directivas 97/23/EC.
- Todos los flujómetros Brooks pertenecen a la categoría 1 del grupo de fluidos.
- Los instrumentos de medición más grandes que 25 mm o 1 pulgada están en conformidad con las categorías I, II o III de PED
- Los instrumentos de medición más pequeños que 25 mm o 1 pulgada siguen la Práctica Aceptada de Ingeniería (SEP).

Directriz Europea respecto a la Compatibilidad Electromagnética (EMC)

Las instalaciones de Brooks Instrument (eléctricas/electrónicas) merecedores de la categoría CE cumplieron con éxito las pruebas que verifican las exigencias de la compatibilidad electromagnética (directiva de EMC 2004/108/EC).
Al mismo tiempo se ha de prestar una especial atención en la selección de los cables de señal, utilizados con los equipos marcados con CE.

Calidad de los cables de señal, piezas de unión de cable y conectores:

El Brooks Instrument ofrece cables de alta calidad, que responden a los requerimientos de calificación CE.
Si se utiliza cable propio de la firma, se ha de elegir uno que sea completamente filtrado con blindaje de 100%.
Las piezas de unión de forma „D" o „circular" deben ser blindadas mediante blindaje metálica. Si es necesario, aplicar piezas de unión de metal para sujetar el filtro de cable.
Conectar el filtro de cable a la caja o manguito de metal blindándolo en ambas caras en 360°.
El blindaje debe terminar en tierra.
Los conectores que pertenecen a las tarjetas normalmente no son metalizados. Los cables utilizados deben ser filtrados con una blindaje de 100% para responder a la calificación CE.
El blindaje debe terminarse en tierra.
Configuración de contacto: Véase Instrucciones de operación adjuntas.

Descarga Electroestática (ESD)

⚠ **PRECAUCIÓN: El aparato incluye piezas electrónicas que son susceptibles a los daños provocados por la electricidad estática. Observar los adecuados procesos para remover, instalar o manipular las tareas y medios de circuitos eléctricos internos**

Proceso de operación:

1. Desconectar la fuente eléctrica de la unidad.
2. La persona debe ponerse a tierra mediante una palanca acodada o por otro medio seguro y apropiado para dicho fin antes de instalar, sacar o ajustar el circuito impreso eléctrico u otro medio interno.
3. El circuito impreso debe ser transportado en embalaje conductivo. Las tarjetas no pueden sacarse de la cubierta protectora exclusivamente directamente antes de la instalación. Las tarjetas desmontadas deben colocarse sin tardar en el embalaje protector utilizado para manipulación, almacenamiento o devolución a la fábrica.

Notas:

Esto equipo no es el único contenido de piezas susceptibles a la descarga electroestática (ESD). En la mayoría de los medios electrónicos modernos se encuentran piezas fabricadas por tecnología de óxido metálico. (NMOS, SMOS etc.). Las experiencias confirman que incluso una mínima electricidad estática puede dañar o destruir dichos medios. Las piezas averiadas, aunque funcionen aparentemente bien, indican una falla inicial.

Swedish

Väsentliga anvisningar.
Läs detta innan du fortsätter !

Brooks Instrument konstruerar, tillverkar och testar sina produkter med syfte att uppfylla alla nationella och internationella standarder. Dessa produkter måste installeras på rätt sätt, handhas och underhållas för att de skall fungera kontinuerligt enligt deras normala specifikation. De följande anvisningarna bör följas och integreras till Ert säkerhetsprogram varje gång när Brooks Instruments produkter installeras, handhas och underhålls.

- För att garantera angiven funktion, använd kvalificerad personal till att installera, handha, uppgradera, programmera och serva produkten.
- Läs alla instruktioner innan produkten installeras, startas upp och underhålls. Om du finner att denna instruktionshandbok inte är den rätta instruktionsboken, titta på i slutet av pärmen för information om hur man kan kontakta lokala representanter. Spara denna instruktions manual för senare behov.

⚠ **VARNING: Kör inte detta instrument utanför dess specifikationer som är angiven i Instruktionsboken. Undvikande att ta denna varning kan leda till allvarliga personliga skador och / eller skada utrustningen.**

- Om du inte förstår någon av dessa instruktioner, kontakta din representant för Brooks Instrument för klarläggande.
- Följ alla varningar och instruktioner som följer med leveransen av denna produkt.
- Installera din utrustning på sättet som anges i den gällande handbokens installationsanvisningar och enligt tillämpliga lokala och nationella föreskrifter. Koppla varje produkt till föreskriven ström- och tryckkällan.
- Igångsättning: (1) Koppla långsamt på flöde i systemet. Öppna processventiler sakta för att undvika för höga flöden. (2) Kontrollera läckor vid mätarens anslutningar för in- och utlopp. Om inget läckage förekommer, kör systemet upp till drifttrycket.
- Kontrollera att processledningens tryck är bortkopplat före service. I fall det behöves kompletteras med nya delar, se till att komponenter föreskrivna av Brooks Instrument används. Samt att kvalificerad personal utför arbetet. Ej rekommenderade komponenter och åtgärder kan påverka produktens prestanda och sätta din driftsäkerhet på spel. ”Felaktiga” ersättningar kan orsaka eld, elektriska skador samt felaktig funktion.
- Se till att anordningens kåpor och skyddslock ligger på sin plats med syfte att förebygga elektriska kontakt och personliga skador; det enda undantag gäller när underhållsarbete utförs av kvalificerad personal.

⚠ **VARNING: I fall av - flödesmätare / regulatorer för vätskor: Ifall ventiler före och efter skall stängas av, måste alla ledningar tömmas på all vätska. Att ej tömma ledningar alt koppla bort trycket kan göra så att vätskans värmeutvidgning kan spräcka / skada utrustningen och orsaka personliga skador.**

European Pressure Equipment Directive (PED) - (Rådets Direktiv 99/36/EG av den 29 april 1999[1] om transportabla tryckbärande anordningar)

Alla utrustning för tryck med ett tryck över 0.5 Bar(g) bar och större demensioner än 25 mm eller 1" (inch) faller under Tryck direktiv 99/36/EG av den 29 april 1999[1] om transportabla tryckbärande anordningar - PED.

- Den här Instruktionsbokens Sektion ” Specifikation” innehåller anvisningar gällande PED Direktivet.
- Mätare som beskrivs i denna Instruktionsbok är i överensstämmelse med EN Direktivet 97/23/EC.
- Brooks Instruments alla flödesmätare faller under flödesgrupp nr. I.
- Mätare som är större än 25 mm eller 1" (inch) överensstämmer med PED kategorier I, II eller III.
- Mätare på 25mm eller 1" (inch) eller mindre faller under Sound Engineering Practice (SEP) (God Teknisk Praxis).

European Electromagnetic Compatibility (EMC) - Elektromagnetisk kompatibilitet

Brooks Instrument (elektriska/elektroniska) CE-märkta anordningar har redan genomgått ett framgångsrikt prov enligt regleringar under Electromagnetic Compatibility (EMC directive 2004/108/EC). Man måstre dock ägna särskild uppmärksamhet till valet av signalkabeln som skall används för CE-märkta anordningar.

Signalkablars, packboxars och kontakdons kvalitet:

Brooks Instrument levererar högkvalitativa kablar som överensstämmer med specifikation för CE-intygade produkter.
Om man använder sin egen signalkabel, då bör man använda en kabel som är fullständigt skärmad med en 100% avskärmning.
“D” eller “Cirkelformiga” kontakdon skall vara skärmade med metalliska avskärmningar. Om det är användbart, bör metallpackboxar som ger en bra fastspänning för kabelskärmar användas.
Kabelavsärmningen måste kopplas till den metalliska skärmande anordningen eller packboxen och skärmas vid båda ändar runt omkring. Avskärmningens avspänning måste jordas.
Card Edge Kontaktdon är icke metalliska. För att överensstämma med krav på CE-intyg, skall de kablarna som används vara skärmade med 100% skärmning.
Skärmningen måste jordas.
Vad gäller stiftkonfigurationen: Se den bifogade Instruktionshandboken.

ESD (Elektrostatiska urladdningar)

⚠ **OBS: Denna utrustning innehåller elektroniska komponenter som är lättpåverkade av skada orsakad av statisk elektricitet. Lämplig hanteringsprocedur måste följas när man tar bort, installerar eller på något annat sätt hanterar inre kretskort eller andra anordningar.**

1. Ström till enheten måste kopplas från.
2. Personalen måste jordas med hjälp av ett armband eller något annat säkert medel innan något kretskort eller andra inre anordningar installerras, tas bort eller justeras.
3. Kretskort måste transporteras i en speciell förpackning för elektronik. Kort skall ej tas bort från deras skydsskåpa innan man skall installera dem. De borttagna korten bör omedelbart läggas i speciell förpackning för transport, lagring eller återlämnande till fabriken.

Anmärkningar:

Dessa instrument är ej unika vad gäller dess ESD **(**Elektrostatiska urladdningar) - känsliga komponenter. De flesta samtida konstruktioner innehåller komponenter som utnyttjar metalloxid teknologi (NMOS, SMOS, o.s.v.). Erfarenhet har visat att även små mängder av statisk elektricitet kan skada eller förstöra dess komponenter. Skadade komponenter - även om de annars verkar fungera ordentligt – har ofta en kortare livslängd. .

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Models MT3809G & MT3810G

LIMITED WARRANTY

Seller warrants that the Goods manufactured by Seller will be free from defects in materials or workmanship under normal use and service and that the Software will execute the programming instructions provided by Seller until the expiration of the earlier of twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller. Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer.
All replacements or repairs necessitated by inadequate preventive maintenance, or by normal wear and usage, or by fault of Buyer, or by unsuitable power sources or by attack or deterioration under unsuitable environmental conditions, or by abuse, accident, alteration, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense.
Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller.

BROOKS SERVICE AND SUPPORT

Brooks is committed to assuring all of our customers receive the ideal flow solution for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration. The primary standard calibration equipment to calibrate our flow products is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit www.BrooksInstrument.com to locate the service location nearest to you.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required.
For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users and maintenance persons. Please contact your nearest sales representative for more details.

HELP DESK

In case you need technical assistance:

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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

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